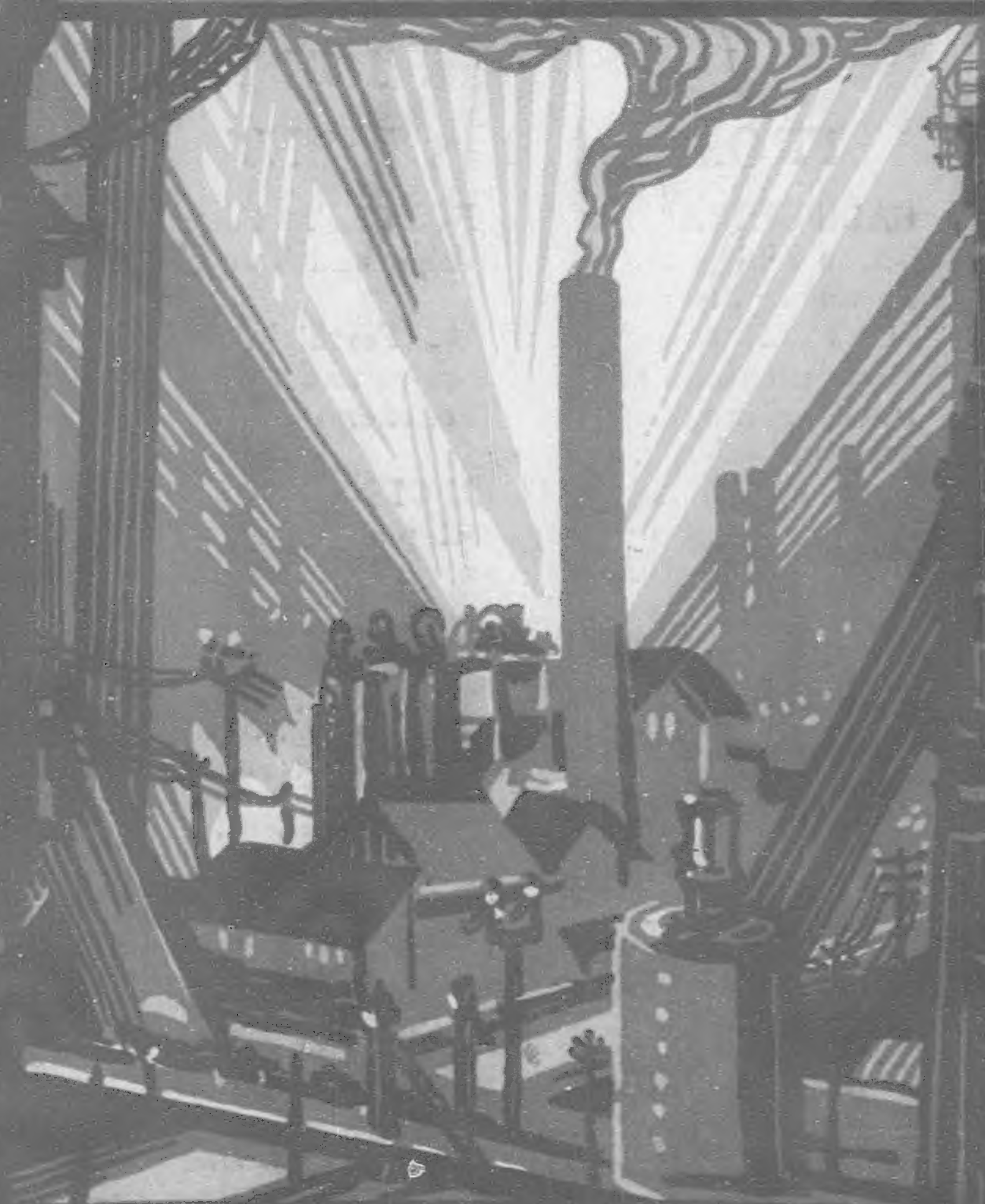


THE FAR EASTERN REVIEW



BACK TO FIRST PRINCIPLES
"LET US BOYCOTT JAPAN!"
GETTYSBURG—PORT ARTHUR
MANCHURIAN MINING PARALYSED

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Back to First Principles!

Behind the Man-made Peace Pacts, the League Covenant and the Nine-Power Treaty are those Hallowed and Almighty Principles of Humanity, Civilization and the Inalienable Rights of a People to Rebel against Oppression, Injustice and Exploitation and Assert their Right to Life, Liberty and the Pursuit of Happiness. These Fundamentals take Precedence over all Political Formulas designed to Preserve the Territorial Status-quo in any Part of the World

By *GEORGE BRONSON REA*

AN American association has been organized to boycott the Japanese. Amongst the leaders are many names prominent in the World Peace movement who profess to see in Japan's resort to self-defense an utter disregard of the Kellogg Pact, the Nine Power Treaty, the League Covenant and the Open Door Policy, nullifying thirteen years of effort to establish international order. From this distance the movement seems to be an over-hasty attempt to implement the peace machinery by bringing the pressure of public opinion to bear upon the League and the American Government to apply prematurely economic sanctions upon a presumptive aggressor nation.

The boycott leaders justify their interference with these highly explosive international problems on the grounds that the governments of the world, handicapped in dealing with Japan by a multitude of problems, are too timid to act, therefore, they have constituted themselves into a super-government in order to enforce their one-sided ideas of how these things ought to be managed. They do not seem to understand or care about the causes which compelled Japan to protect herself while there was yet time to do so. They see only the consequences, ignoring all that had gone before, the horrors, outrages, murders and other provocations which finally exhausted the patience of Japan.

Japan is facing a problem in China identical almost with the one the United States declined to tackle in Mexico. The Mexicans killed our men, ravished our women, exterminated their families, destroyed their properties, confiscated their wealth, heaped insult and contumely upon the nation, befouled our flag, defied our government and did everything possible to make us fight. But it would have taken an army of a million men to clean up Mexico and we chose to swallow our pride, accept meekly our humiliation and save our face through diplomatic protests. What we lost in dignity and self-respect can never be made up by Latin-American friendship.

Conscious of its power the United States can afford to be charitable and indulgent towards a people who relapsed into savagery as the result of a

breakdown of government. But at least we preserved some of our dignity by refusing to recognize the bandit régimes that ruled and spoke for the people of Mexico. The Japanese have gone through the same experience in China magnified many times over, that the United States went through in Mexico, but as an Asiatic state, Japan cannot afford to be as lenient and forgiving when dealing with another Asiatic people who construe all attempts at conciliation as signs of weakness, who outnumber them five to one, hold themselves as the superior race and look down upon and despise the "dwarfs from Nippon."

For this is Asia

The problem in the Far East is psychological and must be viewed from a different angle than the disputes which arise between the nations of the West. It is dangerous to apply the same rules of reasoning to Asiatic disputes, especially those between China and Japan. There are forces at work in this part of the world that can never be regulated by peace pacts or any other instrument for the abolition of war and the sooner the pacifists of America awake to a realization of what it all means to their own future security and welfare, the better it will be for our coming generations. Any student of world problems can visualize the issues that are fast approaching the stage when the pressure of the

rapidly mounting millions of Asia will force an outlet for their overflow. In the coming struggle for mere existence (a struggle whose shadow is now upon us) that the procreative recklessness of the Asiatic will force upon the rest of the world, no peace pacts or machinery for implementing them will stave off the inevitable conflict.

Our pacifists are being carried away by their ideals. They see the edifice they have been so slowly and painstakingly erecting on a foundation of sand, subsiding and beginning to crack under the stress of forces that were never considered in drawing up their plans. And these forces cannot be confined and regulated by

"We hold this truth to be self-evident that all men are endowed by their Creator with certain inalienable rights: that among these are life, liberty and the pursuit of happiness; that to secure these rights governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any form of government becomes destructive of these ends, it is the right of the people to alter or abolish it and to institute a new government, laying its foundation on such principles and organizing its powers in such form as to them shall seem most likely to effect their safety and happiness.... But when a long train of abuses and usurpations pursuing invariably the same object evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government and to provide new guards for their future security."

any wall or dyke reinforced with paper documents or other instruments designed by man to control the laws of nature. The fecund nations of the East will continue to multiply, in China and Korea six or seven times as rapidly as the white man. Long before the rising generation in America has reached maturity, the issue of the races will have to be settled. It can be settled peacefully by the repeal of exclusion and drastic immigration laws, by throwing open waste lands to the colonization of the Japanese, or, if they are to remain at home and absorb their surplus, they must be conceded free access to raw materials and lowering of tariff barriers that will enable them to dispose of the product of their toil. Either that, or we must erect our own wall of steel, build up our defenses, stiffen our backbone and be prepared at all times to meet the issue. If we insist upon closing our doors to the Japanese and then follow them up in Asia and attempt to confine them in a watertight compartment and dictate how they must manage their affairs to conform to our conception of civilization, culture, religion and morals; if, in plain words, we condemn Japan to extinction as a nation, it is no time to talk about disarmament and universal peace. The Asiatic, whether he be Japanese or Chinese, will fight for his right to exist, for his right to procreate and raise children according to his own ideas of morality and religion. The basic conflict is one of opposing civilizations, of birth control and race suicide on one side and a procreative mania based on ancestor worship with polygamy, concubinage and all the facilities for reproduction on the other. Unless the peace-minded people of the United States grasp what all this means to their own security and welfare, the edifice they are struggling so hard to complete will some day collapse and bury them and the nation in its ruins.

The Same Old Theme

The leaders of the peace movement in America are paving the way for another world catastrophe on the mistaken hypothesis that the boycott will compel the Japanese people to stop and consider where their militarists are leading them. They give no heed to the alternative, that the Japanese people might rally around their military leaders and fight to the death for their right to exist. The same appeal worked once, but it will not work again. When Wilson declared war against Germany he employed the same arguments to undermine the loyalty of the German people that his disciples now advance to justify their pacific war against Japan. "We have no animosity towards the Japanese people, but the boycott is a regrettable necessity to make the military clique of Japan realize that treaties are not scraps of paper." The same old appeal to revolt in the hope that out of the chaos, a democratic form of government will emerge and one more orderly empire will go into the discard. The people of Japan are being called upon to repudiate their government, cast off their traditions and all that holds them together as a nation and bring about the downfall of their leaders who, in the last analysis, are making a desperate eleventh-hour effort to save the nation from economic ruin, defeat and extinction.

The pacifist way towards peace worked once. It triumphed, in the case of Germany. The ruthless policy of the Allied blockade holding the club over the German and Austrian peoples to compel them to accept unconditionally the peace terms, was carried through with such a callous brutality that hundreds of thousands of deaths and untold misery were brought about by this method of "pacific persuasion." The same barbarous methods as embraced in the food blockade of Russia took a toll of at least 5,000,000 lives. Germany and Austria were brought to their knees but the heart of every German and Austrian who watched helplessly his aged, his women and his little children die slowly of starvation is seared, hardened and embittered against those peoples who could not defeat them on the battlefield but vanquished them by promises that were not fulfilled and by starving their loved ones. All may be fair in war, but we are getting far away from the traditions of honorable and chivalrous combat.

Germany and Austria were vulnerable from the sea. The Allied blockade was effective and they went down to defeat, through exhaustion. But Japan is not vulnerable in the sense that Germany was. As long as the navy of Japan controls the Sea of Japan and the Yellow Sea, she cannot be starved into submission by any one power or combination of powers, for at her back door on the mainland lie the granaries that guarantee an ample supply of food and even markets for her manufactured products that will

enable her to survive economically. The Japanese have taken the lesson of Germany to heart and know exactly what to expect from the application of the more "humane methods of warfare" as advocated by the same peace-minded enthusiasts who watched without a protest the slow slaughter of the innocents in Europe. Japan entertains no illusions about her fate at the hands of pacifists who mask their ferocity behind an appeal to lofty and humanitarian motives.

Japan feels that she can expect no justice from the nations of the West: that race prejudice, envy and fear will dictate the decision of any dispute she may submit to the League or the Hague for arbitration. For the same reasons that the people of the United States have placed on record their refusal to permit outside interference in their affairs, so Japan declines to submit her vital problems to the decision of any group of western powers. Japan will oppose any attempt to dictate what she shall do where her existence is concerned. She cannot be coerced by any threat or application of the boycott. The Japanese would a hundred times prefer to stand up and fight even though they be exterminated in the end, rather than submit meekly to the long drawn out horrors and misery that a boycott and blockade would entail upon their women and children.

A Time for Statesmanship

The invocation of a boycott against Japan by the American pacifists is a challenge that no nation of fighting men will ignore. Fortunately for the United States we have some real leaders still on the job in Washington. Borah, the great pacifist, one of the foremost leaders of the World Peace Movement, who at first violently arraigned Japan for violating the peace pacts and other treaties, had the courage to declare that before Japan could be subjected to an economic boycott, she must first be proved guilty of breaking the treaties involved in her present conflict with China. This point could not be established under international law without first defining how far she would be justified in going under the right to defensive warfare permitted by the treaties. A wise and statesmanlike utterance.

The remarkable feature of the whole boycott movement in the United States is the attempt on the part of private organizations to arrogate to themselves the functions of government and to impose sanctions and penalties that the State itself, bound by international law dares not endorse without inviting reprisals and eventual hostilities. The steps now being taken to boycott Japan and mobilize American opinion to demand the severance of economic relations with that country, before the case between China and Japan is investigated and adjudicated or before Japan's rights under the treaties to self-defense are clearly defined, would seem to be a most reprehensible and dangerous usurpation of authority by officious meddlers in foreign policies, a flagrant attempt on the part of a peace-minded group to stampede the nation into hostilities for the sake of an ideal that can never be attained until the causes which make for war are eradicated.

American pacifists and professional meddlers in foreign affairs are working true to Chinese traditions, rushing into war behind the peace pacts in order to impose their viewpoint: the first step towards the ultimate Chinafication of the nation. Japan cannot be found guilty of breaking the treaties and adjudged the aggressor as long as the right of self-defense is left to each nation to define for itself. Much also depends upon the definition of the boycott, or as the Chinese call it, "severance of economic relations." A spontaneous boycott may be legal but any open activities on the part of so-called patriotic societies, organized with the support of the government to enforce severance of economic relations with the avowed purpose of ruining financially the nation boycotted, without at the same time severing diplomatic relations, is, for all practical purposes, an act of war. If war is abolished as an instrument of national policy and the boycott weapon may be wielded without waiting for a diplomatic or legal settlement of the dispute, we are simply scrapping one form of honorable warfare for another more deadly and more pitiless, discarding the sword of the warrior for the dirk of the assassin.

And right here is the real test of sincerity to all this talk about boycotting Japan. Japan blundered at Shanghai. Her actions there are understandable to those on the ground and can be explained from the viewpoint of military necessity, but until all the facts are known, it is impossible to justify what she has done.

She may never be able to completely justify herself in the eyes of the world. But this much can be said without prejudging the case in favor of either side. In doing what she did, she was forced to go through with it. Had Japan withdrawn her landing force and vessels, the port and city would have been left to the mercy of the 19th Route Army. Japan was placed between the devil and the deep sea. Had she been wise she would have withdrawn her troops and war-ships and thrown the task of defending the Settlements upon the forces of those other nations whose governments are now loudly condemning her actions. She would then have been blamed for jeopardizing the lives and properties of other foreigners. In the beginning, Japan was criticized because she used the International Settlements as a base for her landing force, thus endangering the foreign population by inviting reprisals on the part of the Chinese, but had she disembarked her troops outside the Settlements limits, she would have been called immediately to account by the other powers for invading Chinese territory in violation of the Nine Power Treaty, the League Covenant and the Peace Pacts. No matter what Japan did, she was wrong. The way things are going in China, it may not be long before the shoe will be on the other foot. Some other nation may have to choose between the jaws of the Chinese dragon or immolation on the altar of the more fearsome deity of the post-War Pacifist.

A Story Yet to be Told

Some day, the true story of the 19th Route Army and its intentions will be disclosed. Nanking had announced the abolition of extraterritoriality to take place on January first and the whole controversy had simmered down to the status of Shanghai, where the wealth of the nation is now concentrated. The army that holds Shanghai and collects the revenues from the port, controls the government recognized by the Powers. It is the last place left to loot in China, the goal of every bandit general in the country. The Cantonese leaders broke with Chiang Kai-shek over the question of an immediate declaration of war with Japan. Could their army hold Shanghai, Chiang would lose the source of his revenues and the Cantonese would rule China. There was every incentive and reason why the 19th Route Army should make a stiff fight for the possession of the city, and if the conversation of the rank and file of that army can be relied upon, it looked forward to entering and looting Shanghai and to repeating the outrages which characterized their entrance into Nanking in 1927. The story is there in the background and the truth will come out in time. Until then, Japan must bear the odium of having bombed a Chinese city and in other ways of bringing the horrors of actual warfare home to the residents of the Settlements who sat on the house-tops watching the daily unfolding of the tragedy.

This was the first time since 1919 when the horrors of war were brought directly under the gaze of Western spectators. The whirr of bombing planes, the roar of artillery, the crackling of rifle fire, the pattering of machine-guns, the explosion of bombs and shells, the blaze of a city in conflagration, accompanied by a constant stream of Chinese wounded and homeless refugees pouring into the Settlements and the whole exaggerated by unbelievable stories of atrocities with all the usual hysterical trimmings, made an emotional and horrifying picture that modern journalism made the most of. The fact that the Japanese landing force was outnumbered at least twenty to one, that they fought against an entrenched foe and over a terrain such as a modern army has never before been called upon to advance over; that they dared not fire in certain directions without imperilling the lives of other defenders of the Settlement or the inhabitants behind the lines; that they were reluctant to dispatch an army until this step became imperative to save the national honor; made their task more formidable than would otherwise have been the case.

The picture as viewed from the side lines and described by the correspondents, hardened public opinion against Japan, even in the Settlement. Yet, when it was suggested to representative foreigners that in view of this criticism and hostility, Japan should withdraw her troops and war-ships, they threw up their hands in horror and said she had to go through with it or the lives and properties of every foreigner would be placed in immediate jeopardy. We do not intend to justify what Japan did in Shanghai. We can only state certain obvious conclusions, reserving judgment until such time as all the evidence surrounding and leading up to the incident is brought out by competent investigators. Our

knowledge of Chinese affairs and the veil of secrecy which conceals from the outside world what is going on in this country, inclines us to the belief that it will be many years before the full truth is known.

The Record of History

This diversion leads up to an affirmation we can now deliver with all the force we are capable of. Without in any way mitigating or excusing what took place in the environs of Shanghai and without fear of contradiction, we maintain that everything that happened there has been duplicated many times over by the Chinese themselves in the prosecution of their own ferocious civil wars. The past ten years have witnessed one major war after another for power and pelf, a series of blood-thirsty conflicts overshadowed historically only by the Great War, the Russo-Japanese War and the American Civil War. All other wars of the last century fade into insignificance. In the number of people killed, starved, butchered and in other ways sent to their death, and in the value of property and wealth destroyed, the Chinese civil wars of the last decade surpass even the losses occasioned by the Great War. Unfortified cities have been bombarded, stormed, sacked, burned and the whole population, men, women and children, put to the sword. In other cases, the leading merchants and officials were tortured and murdered, the women outraged and the youngest carried off to be slaves of the soldiers. The almost incredible barbarities, licentiousness and bestiality which marked the occupation of towns in Central China by the nationalist and so-called communist armies and the ruthlessness of the campaign to suppress the movement in Kiangsi and Hunan, has no parallel in modern history. One has to go back to the days of Ghenghis Khan, Tamerlane and those other Tartar conquerors to find the counterpart of what has been going on in the interior of China. In the last campaign of Chiang Kai-shek against the Feng-Yen combination in Honan, unfortified cities, towns and camps were bombed from the air by an esquadron led by foreign aces. The same is true of the campaign in Kwangsi where the city of Nanning was repeatedly bombed by the Cantonese fliers.

We have seen the armies of Feng Yu-hsiang driven back into Shansi and Shensi where they confiscated the crops and even the seed grain of the people, causing a famine in which five million people perished. We have seen the young women of Shensi sold by the thousands to the brothels of the coast cities and taxed at ten dollars a head as the unfortunates passed through the border likin stations on their way out of the province to a life of slavery and shame. We have witnessed horror upon horror succeeding each other in rapid succession. We have seen the armies of China grow from the few original Peiyang model divisions to a horde of undisciplined looters and ravishers which now number nearly three million men and we have seen banditry grow by leaps and bounds and develop into a spurious communism until to-day there are at least two million of these armed gentry roaming the countryside. We have seen a peaceful, contented, hard-working population of four hundred million people transformed into slaves of a military system upon whose crimes against Humanity and Civilization, the League and the United States have set the seal of their approval by a recognition which elevates this bandit-oligarchy to representation in the Council of a League of self-governing states and a voice in its deliberations.

Where Pacifists Failed

Yet in all these years, we have not heard one American pacifist, one League enthusiast, one outstanding philanthropist, one missionary or one spokesman for the common people of China denounce publicly these atrocities and high crimes against Humanity and Civilization. We go further and assert that it would be impossible for any champion of the down-trodden slaves of Cathay to get a hearing before the League or any of these international up-lift associations either in Europe or the United States. Not until Japan in self-defense started her armies moving in Manchuria, did the American pacifists and professional meddlers and muddlers in foreign affairs discover that there was such a thing as Humanity and the full force of their vindictiveness has been vented not upon the military overlords of chaotic China, but upon the military leaders of orderly Japan. These professional pacifists who uttered no word of protest or condemnation when the bandit generals of China ruthlessly slaughtered and enslaved wholesale their own

people, convict themselves of insincerity when they now pour out the vials of their wrath upon Japan. These high-minded, peace-minded idealists are not interested in the Chinese people; their hearts are not stirred by the sufferings of countless millions of poor defenseless, down-trodden humanity; they are concerned solely with preserving their own usefulness and in imposing their doctrines upon a world as yet unprepared to accept or understand them.

It is the height of human absurdity to outlaw honorable war between two or more civilized states and legalize an interminable internecine struggle for power and plunder, more ferocious, more barbarous, more inhuman and more destructive to human life and happiness than any calamity that God in his wrath or Nature in its most destructive moods could inflict upon the people of this world. It is shameful perversion of human intelligence and morality to cry out to High Heaven against the orderly militarism of a nation represented by an army of 230,000 well-disciplined, scientifically directed troops, while its next door neighbor is overrun, terrorized and held firmly in the grip of an undisciplined lawless horde of five million armed men who have fastened their yoke on the people and cannot now be separated from their prey except by ruthless extermination, a job that no nation or combination of nations dares to tackle. As long as one quarter of the world's population remains in the talons of these blood-sucking armies, fighting each other for territory, revenues and power, with no regard for the rights of the people and with no conception of their obligations to Humanity, it constitutes a gross betrayal of all those principles of right, liberty and justice upon which our own national life is founded, for the pacifists of America to condone these crimes while denouncing Japan's efforts to protect herself and her vital interests against this menace to her security and rights.

American pacifists and boycotters are extremely solicitous about the welfare of the people of Japan, calling upon them to throw off the yoke of a military clique that has no regard for the sanctity of man-made treaties, but there is heard no word of sympathy, no promise of support, no encouragement held out to the depressed millions of China to throw off the yoke of a pitiless militarism that in addition to abrogating and flouting its treaties has shown no respect for the fundamental laws of Humanity, Civilization or of Heaven. Even Secretary Stimson in his open letter to Senator Borah declares that the United States is prepared to uphold a policy that recognizes the right of these vampire armies to all the time necessary for one general to unify his rule by the sword and establish a government that will satisfy the requirements of the Nine Power Treaty, a guarantee of moral support that sets the seal of our approval upon the perpetuation of these outrages and high crimes against humanity. The note indicates how far the nation has departed from those ideals upon which its own liberties and faith are founded.

It tells us that the people who went to war in 1898 for the sake of Humanity, whose hearts were always stirred by the tales of suffering and massacre that came out of Russia, Turkey, Armenia, the Belgian Congo and other places, where man's inhumanity to man aroused indignation in their hearts, are now more concerned with the enforcement of a political formula than they are with the cries of human suffering and distress. The doctrine of the open door and China's territorial and administrative integrity that we would not fight to uphold when violated by Russia, must now be enforced at whatever cost to the despairing, inarticulate millions of China. The great principles of the Declaration of Independence, the right to rebel against injustice, to secede from a system of government destructive of life, liberty and the pursuit of happiness and the right of self-determination, have become subordinated to a doctrine that in its practical operation denies to the people of China the rights upon which our own national liberties are founded.

What the Facts Reveal

It may be that the independence of Manchuria was made possible by Japan's military intervention to protect her own interests; it may be that the new government at Changchun is a provisional or puppet organization upheld by Japan until such time as a more representative government can be called into being. All the opprobrium heaped upon Japan for making this government possible, leaves us cold.

The facts can be briefly and simply stated. When the Japanese troops drove out the main armies of Chang Hsueh-liang, the

absolute despotism of the war-lords collapsed. The so-called government of Manchuria derived its powers not from the consent of the governed, but from its possession of 400,000 bayonets which kept the "stupid people" in subjection. When Nanking refused to negotiate directly with Japan and threw her whole case into the League, Manchuria was left without a government and the Manchurians themselves filled the vacuum. Japan declares she is not responsible for this government, that it was a spontaneous reaction on the part of the Manchurian people to secure the rights that had been denied to them by their oppressors. It is undeniable, however that the people of Manchuria could never have gained their freedom or rights as human beings, had it not been for the presence of the Japanese army and its determination to wipe out a menace that endangered Japan's rights, security and investments. Force was applied, not to bring about a change in the *status quo*, but in legitimate defense of Japan's vital interests. This, in turn, gave rise to the situation that made compulsory the immediate establishment of some form of government.

The creation of an independent state was certainly never a part of the original Japanese military scheme of defense, nor would it have been possible had Nanking consented at once to open direct negotiations with Japan over the matters in dispute. At the worst, all that China would have been called upon to recognize was the validity of the 1915 Treaty and other agreements which would not have interfered with her sovereign rights. By refusing to negotiate direct and leaving the territory without a proper form of government, some semblance of authority had to be established to tide over the interregnum. This opened the way for the Manchurian people to organize a new government and assert their right to govern themselves. Japan made the change possible by the application of force in her own self-defense, but the government she overthrew was the very embodiment of force. Had no government been organized to enforce order the lawless Chinese element would have taken advantage of the situation to inaugurate an orgy of crime, looting, raping, murdering, terrorizing and fighting amongst themselves over the spoils. They started to do just that in Harbin in January, and had not the Japanese rushed their troops northwards to protect their own nationals, the Russians and other foreign residents of the city would have been exposed to certain massacre. No criticism or outcry against the Japanese for violating the treaties is heard in Harbin. "Thank the Dear God that they arrived in time" is the heartfelt expression that falls from the lips of the Russian and foreign community in this city on the banks of the Sungari. It may be true that the independence of Manchuria was the direct outcome of force applied by Japan in defense of her own rights, but it would be difficult to point to any people who have won their independence in the past without outside financial or armed support. The United States would still be a province of England, had it not been for the friendly and timely help of France, a debt we recognized and paid in full when Pershing, uncovered, stood before the silent, hallowed tomb in Paris, and said: "Lafayette, we are here!"

The Cubans had carried on a guerrilla war of independence for five years and were slowly being starved into submission, when the United States went to war with Spain in their behalf and gave them their freedom. But we did not immediately hand the island over to a people unprepared to enjoy their liberties. We kept them in tutelage for four years under a beneficent military government which taught them how things ought to be done and when we thought the time was opportune, we created the election machinery and supervised the voting which placed in power a puppet government committed to a treaty and conditions which perpetuates for all time their dependence upon the United States in certain major international affairs. Every new state carved out of the old Central Powers, Turkey and Russia under the doctrine of the free right of the people to self-determination, achieved their cherished freedom through the guarantee of the Treaties of Versailles and Trianon and the League Covenant. It ill-becomes these new states as members of the League (or the United States) at this late date to place on record that they will not recognize a principle upon which their own independence was made possible. Basic principles which apply in other parts of the world, must apply in China.

A Diplomatic Surrender

For the Government of the United States of America through its Secretary of State to declare that it will not recognize any

change in the *status quo* in China that may be brought about by force, is only another way of saying that it has surrendered and subordinated the principles which underlie its own existence to a diplomatic formula that closes the door of hope to one quarter of the world's population, a step backward in the forward march of human liberty.

The enslaved millions of Cathay, steeped in the most abysmal ignorance, unconscious of their rights as human beings and with no one of their educated leaders with the moral courage to plead their cause, must remain in bondage to a system of government more unnatural, more depraved and more callous of fundamental human rights than any recorded since the dawn of history. These five hundred million slaves held in subjection by an army of three million men and preyed upon by another two million bandits, pirates and so-called communists, are told in so many words by the Government of the United States that they can never hope to escape from their bondage by any help from the outside. That way out of their misery is denied to them by the notes of Secretary Stimson. Slaves they are and slaves they must remain. But these notes do not deny to the bandit oppressors *their* right to self-determination or to declare and maintain their independence from others of the same breed recognized by the outside world as the Government of the Republic of China:

The war-lord of Manchuria and the bandit oligarchy that surrounds him has the right to rebel, secede and set up an independent government at will; he can enter into treaties with other countries and lead his armies beyond the Wall to conquer his rivals; he can enter into an alliance with the recognized military faction and become the Co-Ruler of China and outside nations will applaud, condone and invite him to send his representative to assist them in making laws which the freemen of the world must bow down to and give their lives to uphold. This is the tragedy that the League and the United States seem determined to prolong. If Japan, in self-defense and for the protection of her own vital interests, attempts to free the people of Manchuria or in any way assists them to achieve their independence by force, or makes it possible for them to shake off their shackles, she must be arraigned as a treaty-breaker, exposed to world execration, boycotted and ruined by the great liberty-loving Democracies of the West who would not lift their little finger to advance the cause of Humanity in the Far East. The slaves of China must bow to the law of the

League, to the law of the Treaties and Peace Pacts, which fastens and rivets the yoke more firmly on their necks.

How, in the name of common sense, can the people of Manchuria assert their right to life, liberty and the pursuit of happiness, except by force? Who is to be the judge of Japan for extending a helping hand to the thirty odd million enslaved people in this part of China? There are times when even the most solemn and sacred treaties must be subordinated to the higher dictates of Humanity, Civilization and Democracy and, this is one of them. If ever a nation should be commended for its championship of human rights, Japan should be supported in what she is now doing in Manchuria. Japan may have her own selfish interests to advance, but these interests are vital to her continued existence as a state. Underneath it all lies a principle that no self-respecting American can reject without repudiating the ideals upon which his own liberties and rights are founded.

We preach about law, peace and humanity while one quarter of the human race is degraded, outraged and driven to despair. Where there is no law, no justice and no protection to life and property there can be no contentment, no incentive to advance. So the slaves of China are expressing their discontent in the only way open to them. The land has been converted into a charnel house, the graveyard of the hopes of a nation. The world cannot always remain indifferent to the wrongs of the Chinese people. It is only beginning to pay the bill that will be presented and collected in full when the land is handed over to the Communist hordes now gnawing deeply into the very vitals of the country. What then will become of the Nine Power Treaty, the Open Door, the League Covenant, the Kellogg Pact and the rules for the conduct of nations known as International Law?

If a thing is morally wrong it cannot be legally right. If the treaties, agreements and understandings which constitute international law are based upon policies which reject fundamental human rights and liberties and there is no way other than by force to remedy these wrongs, then International Law, the League Covenant, the Sacrosanct Nine Power Treaty, the Kellogg Peace Pact and all the doctrines which proceed from them are **FUNDAMENTALLY, ETERNALLY AND IRREVOCABLY WRONG AND NO SPECIAL PLEADING OR OFFICIAL SANCTION CAN EVER MAKE THEM RIGHT!**

“Let Us Boycott Japan!”

By GEORGE BRONSON REA

IN 1904, Japan staked her existence on the plains of Manchuria against the then most powerful military machine in the world. She again faces a crisis in which her existence as a state is at stake and once more the people of Japan with their backs to the wall are determined to fight it out. Japan will brook no interference with what she is doing in Manchuria, even though the whole world unites to condemn and penalize her. The Powers gave no heed to her vital problems in 1921 when her alliance with Britain went into the discard and left her exposed to the come-back of Russia. Since that date she has witnessed the slow, steady spread of communism in Asia until it now dominates large parts of China, menacing her security from without and sapping the foundations of the State from within.

Japan has no time to consider the legalities or submit her problems to a group of Powers whose diplomacy brought this peril upon her. Unless Japan stiffens her backbone and acts to protect herself while there is yet time, in another six months it will be too late. The struggle between Japan and the Soviet is now on, with the latter secretly lined up with the Chinese bandit armies in North Manchuria, supplying them with arms and munitions. The basic issue of the Far East may have to be faced at any time, with open war between Japan and her old antagonist for control of Manchuria.

In the eyes of the world, Japan may be technically wrong, but no laws or treaties can deprive the nation or the individual

of the right of self-defense. Japan stands pat on her version of how the incidents of September 18 and January 28 were started, resting her case on the official reports of her army and navy commanders on the ground. The people to a man stand behind their government, determined to again stake their existence on what they believe to be right. The independent State of Manchukuo will be recognized by Japan as soon its Government is properly organized and functioning and the Japanese army will defend the new state from all outside aggression. Japan will not shirk her obligations as she understands them. Should she recede now, Manchuria will be overwhelmed by the Soviet. It is either Japan or Moscow, with the fate of the Far East and Civilization in the balance. China as a nation does not enter into the picture. She had her chance, threw it away and brought the menace closer to the doors of Japan. China is still the nominal suzerain of Manchuria, as she is of Mongolia—on paper—where she dares not exercise her prerogatives. Should Japan fail now, Manchuria will go the way of Mongolia and the Soviet would then spread its net for Korea. The issue is clear cut. Japan has set her hand to the plow and cannot turn back. It is now or never for Nippon. Should the League of Nations supported by the United States decline to recognize the legitimacy of her actions and attempt to enforce an adverse decision by the application of economic sanctions, the boycott to be effective must be enforced by a blockade. The blockade means war.

Implications of a Boycott

A boycott against Japan by one, two or three nations will simply deflect their trade with Japan through neutral channels, or worse yet, hand over their trade to those neutrals who can supply her needs. A thoroughly effective boycott is possible only when all countries take part and enforce it through a blockade of Japanese ports in which case, Japan would use her military and naval forces to break the blockade.

In view of the determination of Japan to uphold at all costs her security and economic rights in Manchuria, it may be difficult to obtain unanimous consent to the application of economic sanctions under Article XVI of the League Covenant. Even if such a decision be arrived at, its practical effect upon Japan depends upon the extent and duration of the boycott. Would the boycott be enforced until Japan was ruined financially, or would it be continued just long enough to permit her competitors to take over her trade and profit by her misfortune?

One nation may cast its vote in favor of a boycott to uphold the League but another nation may consider its own interests and register its vote against Japan for the selfish purpose of supplanting her trade in certain markets. Americans, for instance, may believe that a boycott which deprives Japan of her main export market for silk will bring her around to their viewpoint, but other countries may entertain an entirely different conception of economic sanctions which hand over to them the profitable markets Japan has built up after years of hard work and sacrifices. If a boycott is maintained just long enough to cause a revolution in world trade to the injury of Japan and then is lifted, international justice would be prostituted for selfish national ends, a despicable form of pacific warfare that no self-respecting people would care to be associated with.

The nation that would profit most from a world boycott against Japan would be Great Britain. Yet, faced with an unprecedented financial and industrial depression, seeking everywhere outlets for her trade, at her wits end to balance her budget and provide work for her unemployed, the British sense of fair play scorns to take advantage of a nation boycotted under such circumstances. From the British viewpoint, no British or international interest is at stake in Manchuria and as long as the door to trade remains open, they are not concerned, with Japan's efforts to stabilize conditions there. If anything, British opinion favors any move on the part of Japan that will check the Soviet advance into China. Britain recognizes that she made a mistake in 1921 in throwing overboard her alliance with Japan in the hope it would lead to closer Anglo-American accord in Far Eastern affairs. This hope has never been realized. When the crucial test came in 1927 and Great Britain and France proposed the application of sanctions to safeguard their interests, the United States declined to co-operate. We stood with China and now face the consequences. When, at this supreme crisis in our Far Eastern policies, we invite the British and French to co-operate with us in applying pressure or sanctions upon Japan for doing exactly what Britain wanted to do in 1927, we are administered a dose of our own medicine and it is not very palatable. The British and French are eminently practical. They also have long memories. Neither nation will now agree to join in boycotting Japan to further the special policies of the United States. If we boycott, we boycott alone and if the boycott leads to war, we will fight that war alone. Six months or a year of economic sanctions effectively applied would result in a complete loss of Japan's overseas markets to her competitors, a penalty equal to if not greater than any damage that might be inflicted upon her by open warfare. A nation sentenced to ruin and starvation by international law will fight for its right to exist. In September, 1923, in two days of horror, Japan suffered more than if the combined fleets of the world had bombarded the capital and chief port for six months. That catastrophe welded the nation together firmer than it had been before and the same spirit to survive would sweep over it at any attempt to starve it into submission. Would the application of the boycott bring Japan to her knees? Has Japan the resources to enable her to withstand such pressure and, if needs be, wage a defensive war to preserve her existence? Before we advocate a boycott against Japan, it might be just as well to inquire into her ability to stand alone and fight it out.

How is she off for iron and steel, the basic requirement of the national defense of any nation?

What the Figures Show

It would surprise our enthusiastic boycotters to learn that Japan can now supply most of her own iron and steel requirements from within the country and carry on a war of defense for at least eighteen months from her reserve stocks of iron ores and by eliminating or cutting down her consumption of commercial steel she could hold out for three or four years, always providing she retains control of the Sea of Japan and the Yellow Sea.

The following figures in Japan's iron and steel industry will help us to understand her position in regard to these basic requirements. In 1896, when the Government Steel Works at Yawata commenced production, Japan was importing 220,000 metric tons of steel. In 1906, the consumption was 400,000 tons of which 16 per cent was produced at home. In 1916, the consumption had increased to 800,000 tons, of which 46 per cent was produced within the country. In 1926, consumption reached 2,060,000 tons, 61 per cent of which was supplied from within. In 1929, consumption reached its peak at 2,620,000 tons and Japanese makers supplied 2,030,000 tons or 78 per cent. In 1930, consumption declined to 2,130,000 tons, of which ninety per cent (1,920,000 tons) came from domestic mills, but had these mills been taxed to their full capacity they could easily have supplied all the requirements of the home market. On this basis, Japan can at any time supply from within, ninety per cent of her requirements or one hundred per cent if other sources are closed to her. Outside of a few special shapes Japan can now roll practically the entire list of structural steel forms, including rails of any size or weight.

In the event of a boycott, Japan could no longer rely on imported pig or scrap from America or Europe to meet her requirements of 2,000,000 tons of pig-iron, of which, 1,700,000 are needed for the production of steel, and 300,000 tons for casting purposes. In 1930, Japan produced 1,560,000 metric tons of pig-iron, but could readily have supplied all her own requirements. The importation in large quantities of Indian pig into Japan is due solely to its cheapness, but in the case of a boycott Japan can meet all her own requirements from the mines in Japan Proper, in Korea and Manchuria.

It is a fallacy to assume that Japan has insufficient natural iron resources to meet her needs in an emergency. She imports considerable quantities of ore because of cheapness but if these outside sources of supply are closed to her, the mining of domestic ores would then become compulsory and cost of production a secondary consideration. Some 3,690,000 tons of iron ore are necessary to produce 2,000,000 tons of pig. In 1930, the production within the Empire was as follows: 380,000 tons in Japan Proper; 580,000 in Korea and 808,000 tons in Manchuria, a total of 1,840,000 tons, or about half the quantity required to produce 2,000,000 tons of pig. Japan Proper has considerable reserves of iron ores; Korea more than 150,000,000 tons and Manchuria 500,000,000 tons in sight and a billion and a half tons total deposits. With proper encouragement, it would not be difficult for Japan to double her present output of iron ores to meet her actual needs. It might cost a little more, but a nation thrown on its own resources can accomplish things in times of stress that would never be attempted as a purely commercial proposition. In 1931, Japan's consumption of steel declined about 15 per cent and it would require only about a forty per cent increase in her ore output to meet this demand, a deficiency that could easily be made up from the deposits under her direct control.

In the event that a boycott led to actual war, all commercial steel requirements would be sacrificed to the needs of national defense, or about a million tons a year. This quantity could readily be supplied from the domestic ores. About 100,000 tons of high grade steel for armor plating, heavy guns and other armaments are made within the country at the Kure Naval Arsenal, the Japan Steel Works and the Kobe Steel Works. Japan is now equipped to produce all her requirements in these lines. Ten years ago, Japan had to import pig from Sweden and England in order to produce high grade steel for military and naval purposes but she now produces the same steel from the local ores and the coke obtained from Anshan in South Manchuria.

In war time, the consumption of commercial steel automatically declines and if Japan is subjected to a boycott or forced into war there will be no shortage of commercial steel for the first five or six years. The Government Steel Mills at Yawata carries a stock

of two million tons of reserve iron ores and if imports were suspended totally and the domestic output did not increase at once, Japan can supply all her steel requirements for eighteen months from the stocks at Yawata and in Manchuria. In effect, Japan could tide over her iron and steel difficulties for at least three years under a complete economic blockade, a fact that should give the boycott enthusiasts something to ponder over.

Nickel and Tin

On the other hand, Japan is entirely dependent upon outside sources for her supply of nickel and tin, both indispensable for the manufacture of arms and munitions, an obstacle that can be surmounted by purchasing and storing sufficient quantities in anticipation of hostilities. It has been proposed that the Government purchase for storing against such an emergency, 9,000 tons of nickel in three years as part of a specie reserve against which the Bank of Japan might issue notes up to about \$8,000,000 gold. The implied menace to Japan in the agitation for the application of economic sanctions may result in some such plan for the purchase and storing of a sufficient supply of nickel and other essential commodities to tide the nation over any war emergency.

As to tin, the same conditions would apply, with the modification that would arise from any change in the strategic situation that would give to Japan the control of the South China Seas. Unless France joined in the boycott and maintained an efficient blockade of the Gulf of Tongking and the Hainan Strait, Japan could procure her supplies of tin from the mines of Indo-China and Yunnan. With perfect control of the China Sea she could also draw on Siam for this metal. Only an effective boycott and blockade participated in by France, Great Britain and Holland, could deprive Japan from procuring her tin supplies from these producing centers in the South Seas.

Japan is also deficient in manganese, but important deposits of this mineral have been discovered recently in Kochi Prefecture that can supply the national requirements for five years under stress of war or blockade. Japan does not produce a single ton of aluminium, but in time of emergency this industry can be established if the cost of production becomes a secondary consideration. Neither does she at present produce magnesium, but there exist at Tashichiao in South Manchuria almost inexhaustible deposits of magnetite, now used for the manufacture of bricks, but from which the metal can easily be extracted.

Japan is now self-sufficient in military aeroplanes, including engines and all materials with the exception of a few special items not procurable within the country. However, this deficiency in special materials will not preclude the manufacture of serviceable planes in time of war. The most serious problem is a supply of duralumin for making propellers, but in case of stress the wooden veneer propeller can be used.

Japan's Oil Requirements

Japan is weak in petroleum resources but for many years has been storing fuel oil for her navy and what with other fuels she would be able to carry on for a period much longer than is generally assumed. Japan's present requirements are as follows:

Gasolene ;	Total consumption in 1930	...	3,089,000 koku
	Importation	...	1,882,400 "
	Local output	...	425,300 "
	Output from imported crude oil	...	781,400 "
Kerosene ;	Total consumption in 1930	...	925,000 "
	Importation	...	590,000 "
	Local output	...	135,000 "
	Output from imported crude oil	...	199,200 "
Light Oil ;	Total consumption in 1930	...	1,205,800 "
	Importation	...	708,000 "
	Local output	...	505,000 "
Lubricant ;	Total consumption in 1930	...	983,800 "
	Importation	...	226,000 "
	Local output	...	501,800 "
Other Fuels ;	Total consumption in 1930	...	3,379,000 "
	Importation	...	3,138,800 "
	Local output	...	117,800 "
	Output from imported crude oil	...	112,800 "

In addition to the above there was a total importation of 3,470,000 koku of petroleum fuels. The consumption of gasoline has been increasing at a rapid rate, the increase in 1931 over the preceding year being 17 per cent, nearly all of it coming from the United States and countries under British control. An economic boycott against Japan by these two nations cutting off her petroleum supplies would constitute the gravest obstacle to her ability to wage a prolonged war. On the other hand, Japan has certain undeveloped resources and possibilities that can be utilized to diminish her dependence upon outside sources of supply. One of these is the natural gas field in Formosa owned by the Nippon Petroleum Company and now being developed, promising in the immediate future to furnish the same quantity of gasoline now produced in Japan from imported crude oil. The company expects that this natural gas field will before long produce daily some 2,000 koku, as 1,000 koku of gasoline is obtainable from 100,000,000 cubic feet of gas.

Under stress, the shale oil plant at the Fushun Collieries in Manchuria could be expanded to double or treble its present capacity of 70,000 tons of crude oil and 10,000 tons of paraffin. Although the plant is not yet a commercial success, it is not losing money. In a national emergency covering a period of years, the plant will materially help to cover the needs of the navy. Faced with the possibility of having their importations of petroleum cut off by a boycott or war, the Japanese have conducted many experiments for using substitutes for heavy oils and have been able to burn successfully soya-bean oil as fuel. How far these experiments have progressed it is difficult to state but it can be reasonably assumed that if forced into a corner, the immense supply of bean-oil from Manchuria will be utilized to advantage for every commercial purpose, releasing all petroleum oils for the use of the navy. Japan has also a sufficient supply of industrial alcohol from the sugar mills of Formosa that in many cases can be utilized as substitute for gasoline. The Army has also perfected and is now operating a large number of trucks which burn charcoal as fuel. Japan might surprise the rest of the world in her ability to weather a boycott which deprived her of her outside supplies of petroleum, gasoline and fuel oils. It is a possibility that cannot be lightly disregarded in any serious discussion of applying economic sanctions to Japan. For, if thrown on her own resources and compelled to utilize soya-bean oils to the point where it may be developed into a commercial proposition, it would revolutionize the whole fuel oil trade of the Far East and hand over to Japan the quasi-monopoly now enjoyed by the United States.

Russia as a Source of Supply

Or, in the event of war or a boycott, in which the Soviet did not participate, Japan might obtain her petroleum supplies from that quarter. The Soviet is now dumping its petroleum products in Europe and in Manchuria and Korea. In the event of a simple boycott by the League of Nations and the United States, Japan could import her supplies from the Black Sea, but if the boycott is supported by a blockade, this source of supply would also be closed. A limited amount could be shipped over the Trans-Siberian Railway, which, added to other supplies, might enable Japan to carry on. In effect, Japan's vulnerability in the matter of petroleum, would rest largely with the attitude of the Soviet. If Moscow should decline to co-operate with the boycotting League and enter into some agreement with Japan it is quite possible that enough tank cars could be built or improvised to transport Japan's minimum needs in petroleum products, though at a relatively high cost. It could be done.

Japan has other weaknesses connected with the oil industry, which however, are in process of being eliminated. One of these is the supply of large size steel pipes for use in oil wells. At present, the Japan Steel Tube Company does not produce six inch pipe but during the present year the plant is being expanded to manufacture steel pipe up to twelve inches in diameter. Japan is also somewhat short on tin plate, a temporary handicap. Her needs are about 85,000 tons of various thicknesses and characteristics, exclusive of some 15,000 tons consumed in bonded warehouses. The total consumption is therefore about 100,000 tons. The Government Steel Works at Yawata is now producing about 35,000 tons a year but the output from this plant can be increased to 40,000 tons. An additional tin plate factory with a capacity of 50,000 tons per year is now in course of erection and will be in operation

in another twelve months. Then, the entire tin plate requirements of Japan can be supplied from the Government Steel Works.

The manufacture of sulphuric acid is the most important chemical industry in its relation to explosives and fertilizers and here Japan is well equipped, having a producing capacity of 2,000,000 tons a year, of which only 70 per cent is being marketed. The industry is on a sound basis as Japan has sufficient raw materials within the country for unlimited production. Japan also supplies more than eighty per cent of her soda-ash requirements with reliable salt resources and the technical ability and equipment to expand the industry within eight months to meet her entire consumption. In the event of war, additional factories could be erected to meet all demands. Japan produces only 1,200,000 tons of salt, which is mostly consumed in the food supply, leaving only 300,000 tons for industrial purposes. The salt for her chemical industries comes from the Kwantung Leased Territory, from Tientsin and from Tsingtao, well within the sphere of control of the Japanese navy.

In caustic soda, another essential for explosives and industrial uses, Japan consumes 70,000 tons a year, importing some 25,000 tons. Out of twenty-two factories for the manufacture of this chemical, only ten are now working, but the other twelve can be put into operation at any time. Hydrochloric acid is obtainable in any quantity from salt and sulphuric acid. Japan also consumes some 15,000 tons of nitric acid, all of which is produced in the country and further factories can be built within six months.

Regarding Fats and Oils

In regard to oils and fats, Japan is now an exporting country. A few special oils are still imported. Hardened oil from herrings and sardines is an established industry in Hokkaido and Korea. The production of soya-bean oil in Manchuria, entirely under Japanese control, is capable of unlimited expansion and can be manufactured into a large variety of oil products. In this special field of oils and fats, no boycott can affect Japan as long as her navy retains control of the Sea of Japan and the Yellow Sea.

The application of a boycott would however immediately affect Japan's supply of medicines, such as quinine, morphine, boracic acid, aspirin and many other modern drugs which cannot be produced within the country owing to lack of raw materials. A shortage of such medicines would have most serious effects from the humanitarian point of view and entail more suffering and hardship on defenseless people than actual warfare.

Nitrogen, a highly important factor in the manufacture of gunpowder and explosives is produced in Japan in excess of the consumption. The output now reaches 820,000 metric tons of sulphate of ammonium as against a demand of some 710,000 tons. In the event of war, the local consumption would increase due to the necessity of using more fertilizer in the soil to make good the deficiency in labor supply caused by the enrolment of the young male population in the fighting forces. On the other hand, there is reason to believe that the consumption of fertilizers will decrease, especially the nitrogenous. Sericulture calls for the largest consumption of nitrogen fertilizer, but as this industry will be greatly restricted as the result of a boycott or war, the mulberry fields will be cultivated to wheat and other food cereals that call for much less nitrogen. This class of fertilizer includes bean-cake, fish-meal and bone-meal in addition to sulphate of ammonium, all of which are available in Japan in sufficient quantities. Picric, nitro-glycerine and other explosives have a nitrogen base of about 12 to 13 per cent, calling for about double that amount in the actual manufacturing process. The productive capacity of Japan can take care of all future requirements in these lines.

One of the key minerals that Japan must import is asbestos and a boycott would seriously menace her various chemical industries and might bring about their collapse. Japan is also completely dependent upon outside sources for her potash supply, importing 70,000 to 80,000 tons a year from France and Germany. If these two countries join in an economic boycott, Japan would be absolutely cut off from a supply of this essential commodity. Her agriculture might get along without potassium for a few years, at the sacrifice of her tobacco crop which consumes 10,000 tons. A certain amount of potash, inadequate however for her requirements, could be extracted from seaweed, but the process is uncertain and costly.

An economic boycott would also deprive Japan of her supply of phosphates, her consumption of this fertilizer reaching a million tons a year in the form of super-phosphates containing about 18 per cent of phosphorus. This fertilizer while not necessary for rice is essential for wheat. At least 500,000 tons of super-phosphates are absolutely necessary for Japan to maintain her present crops of wheat and other cereals. Phosphate rock, the only sources of this fertilizer, comes from various South Sea islands and the northern African or Red Sea coasts. If Japan could not control the seas around the Philippines and Guam, she would be faced with a serious food problem. The vital necessity of phosphate and other fertilizers for Japan can be sensed from the fact that forty years ago, Japan produced only 30,000,000 koku of rice while the last crop was 65,000,000 koku, an increase due chiefly to the liberal use of modern chemical fertilizers. Any restriction in her ability to import these chemicals would be felt immediately in an immense drop in the volume of her principal agricultural products. There are a few small islands under Japanese mandate in the South Seas which produce phosphate rock and with proper exploitation of these deposits, she could supply a fair part of her requirements. But this could only be achieved by the ability of the Japanese Navy to command the South Seas at all times.

Salvation in the Soya-Bean

It would seem that Japan could soon be brought to the famine stage if through a boycott, blockade, or war, she is deprived of the above essential commodities, but this conclusion holds good only as long as her people adhere to their present diet. If a change in their food system becomes compulsory, the Japanese can never be starved into submission. At present, Japan produces sufficient rice to feed her entire population, together with good crops of wheat, barley, rye and other cereals. Korea can also supply a large quantity of rice, while from Manchuria will come an unlimited supply of soya-beans which are capable of being prepared into many very palatable and nutritious dishes. They even extract milk out of these beans. The soya-bean is like the conjurer's hat. The chemist keeps pulling out of it the most unexpected things, all good to eat. Japan takes 700,000 tons of soya-beans from Manchuria out of its total production of over 5,000,000 tons.

Wheat presents an immediate problem for Japan in the event of a boycott. Her annual importations of this staple for the last several years averages 700,000 tons, coming mostly from the United States, Canada and Australia. About 200,000 tons of this is re-exported to China and elsewhere in the shape of flour. The Japanese flour-mills are at present producing high grade flour, that is, up to about 70 per cent of wheat consumed, but in time of food emergency (as Germany did during the war) the extraction would be increased to 95 per cent, thus increasing the flour output by thirty per cent. Manchuria would automatically become the granary of Japan in the event of a boycott or war. The output of wheat in Manchuria (1,300,000 tons) with her own production would more than suffice for Japan's needs. That she has not purchased her requirements from this producing region is due chiefly to higher quotations as compared with American or Australian wheat, a condition that would disappear in the face of necessity. With the other cereals produced in Manchuria, kaoliang, millet, maize, rice, etc., (about 12,000,000 tons in all) Japan would be well supplied with food-stuffs without worrying about the shortage at home arising from a lack of fertilizers.

If Japan should assume responsibility for the agricultural development of Manchuria as a war or boycott measure, it will bring about another revolution in the world's wheat trade, bringing in another producer to compete with the American farmer abroad. That is on the cards whether Japan is subjected to a boycott or not, as Manchuria under any form of decent government, guaranteeing law and order, protection against bandits, sound currency and recognition of the right of the people to sell their produce in the open market, will forge ahead and become one of the great granaries of the world. Japan cannot be starved into submission and she is apparently not worrying about the food problem in the event of a war or a boycott. The League will never be able to do to Japan what the Allied Powers did to Germany, unless they send their fleets in the Sea of Japan inside the Loochoo barrier, and annihilate her navy, which is another story.

Japan's Silk Trade

We come to silk, Japan's mainstay in world trade. Her silk industry would suffer most from an economic boycott in which the United States participates. The total annual output of natural silk in the world is about 158,000,000 lbs. of which Japan supplies about sixty per cent, China thirty per cent, Italy seven per cent and all other countries three per cent. Of the above total, 110,000,000 lbs. or seventy per cent, is exported by the producing countries and of this Japan's share is about seventy per cent, China's, twenty per cent and Italy's ten per cent. Japan's exports (77,000,000 lbs.) corresponds to eighty-five per cent of her annual output. It is an easy matter for American importers to boycott Japanese natural silk, without any serious effect on the American market which could satisfy its requirements by utilizing artificial silk.

The effect of such a boycott upon Japan may be gathered from the fact that at least 12,000,000 people are engaged in the various ramifications of the industry and any decrease in the present output would automatically throw out of employment a proportionate number of workers. It has been suggested that if boycotted, Japan should maintain her silk industry by producing silk at a low cost and using it as a substitute for wool and cotton, but there is little hope that such a plan could be carried out. Sericulture and silk reeling as conducted in Japan is almost a science and any attempt to save labor and lower costs will result in deterioration of quality and a decline in output. Under boycott conditions, the output of natural silk would decrease by at least one-third during the first year and the price would decline to Y. 400 against Y. 650 at present exchange quotations.

The recent annual output of silk has been about 700,000 bales of which some 600,000 bales were exported, leaving 100,000 bales for domestic consumption. If exports are cut off altogether, the home consumption may increase to 250,000 bales a year at the maximum. If Japan's silk industry should be decreased to one-third of the present output, some 8,000,000 workers would be affected, giving rise to social problems and unrest that would cause an industrial revolution, if not worse. That this unemployment would lead to an internal revolution and the overthrow of the government and dynasty is highly improbable. It would simply stiffen the determination of the nation to fight for its right to exist.

The Japanese do not seem to be particularly alarmed over the prospect of losing their pre-eminence in the world's silk trade as a result of China or Italy taking over her markets. These countries may profit through higher prices arising from a temporary monopoly, but it takes something more than cheap labor, available land and favorable climatic conditions to succeed in this industry. Otherwise, China would be the dominant factor in the trade. There is something peculiar to the Japanese people which has enabled them to dominate in this particular industry. It would take China or Italy at least six or more years to establish their silk industry on any basis likely to permanently take away Japan's lead. As long as natural silk is preferred for dress materials and the demand remains at its present level, Japan feels confident that even after a prolonged boycott she can easily regain her supremacy in the industry.

Wool Supplies Adequate

As to wool, Japan relies entirely on foreign supplies, importing last year 550,000 bales, mostly from Australia, but some from South Africa and the Argentine. Although the Government has heavily subsidized the home wool industry, the output does not exceed a thousand bales. Japan's wool purchases in Australia represent about thirty per cent of the total clip and a boycott in which Australia joined would work both ways. The Japanese army has accumulated large reserve stocks of wool and with the stocks of the woollen mills, the country has sufficient wool to meet its demands for at least two years without further importations. However, Japan's importations of woollen yarns amount to 7,000,000 lbs, coming mostly from Germany, Poland and England. The domestic yarn factories in Japan would be able to supply the demand only if the raw wool could be obtained. As for woollen fabrics, Japan's imports are chiefly confined to the highest grades from England, which could be dispensed with in time of national stress. Japanese civilians who now dress in foreign style clothes would revert to the national costume largely of silk and release

all the wool stocks for military and naval uniforms. Japan could pull through a few years without wool.

Japan's cotton spinning and weaving industry would be hard hit by a boycott and ruined completely if command of the Yellow Sea and the Sea of Japan is lost to her. This contingency, however, is very remote. All of northern China and Manchuria would come within her sphere of influence and unless the war-fleets of the League Powers hazard the risks of passing through the Formosan Channel to blockade the mouth of the Yangtze, Central China would also remain within her sphere of activities. Japan's defense plans however may be directed towards keeping her battle fleet in home waters, guarding the really vital joints in her armor and the Yangtze region may be open to any vessels that care to run the risk of entering the Japanese naval trap. This supposition is hardly a sound one for should Japan forego her strategic advantage and permit the passage of a League fleet through the Formosan Channel strong enough to blockade the China coast from Amoy to the Saddle Islands and the League admirals steamed through this invitingly open door, they would probably be more concerned as to how they were going to get out again than in conducting the blockade. Once past the Pescadores, the League fleet would be in the "tiger's mouth." It is difficult to visualize a boycott of Japan enforced by a blockade closing to her vessels the entrance to the Yangtze River.

How China Would Fare

Under these conditions, with the Japanese fleet controlling the Yellow Sea, Japan's export of cotton yarn and piece goods would be decreased to about twenty-five per cent, if that. Central China would be at Japan's mercy and the Chinese would have to trade with her or do without their own necessities, while American, British, French and all other trade with Shanghai would cease. Here is another instance where the boycotters would be boycotted in a manner they never anticipated. If Japan can control the Yellow Sea, her markets in Central China are fairly well assured and in this case she would probably not need to curtail her cotton yarn and textile production more than fifty per cent of her present output. Japan may lose to the British her markets in India, the South Seas, Africa and the Near East, but will be compensated by taking over the British trade in Central and North China. A fair exchange.

The supply of raw cotton would become a serious problem to Japan in the event of a boycott or a war as her supplies from the United States, India and Egypt would be cut off. Japan is a canny buyer of this staple and at the present moment has sufficient stocks of raw cotton on hand to meet her requirements for eighteen months on a basis of one-half her present production of finished materials. Her recent big purchases of raw cotton in the United States will probably further increase these stocks on hand and enable her to hold out for two years or more without further importations from the main producing countries. On the other hand, Japan can make use of the raw cotton obtainable from within her sphere of influence, from Shantung, Kwantung Leased Territory, from Mongolia and from Korea. If the cotton from the Yangtze region is included, she could manage to pull through without difficulty. As a matter of fact, the Japanese textile industry is looking forward to Shantung as one of its future sources of raw cotton supply. This cotton is of fine quality and its production can be readily increased under the stimulus of a demand. While Japan is using up her reserve stocks during the first two years of a boycott or war, she will be able to encourage the cultivation of this staple in these near by regions to an extent that will supply her requirements and enable her to hold her trade in her special spheres of influence. With perfect command of the Yellow Sea and the Sea of Japan, Japan is not worrying unduly about her cotton industry and her ability to meet the demands of her home market as well as North China and Manchuria. Here again, the boycott would simply cause another upheaval in the world cotton trade, and once the cultivation of the staple is encouraged in Shantung under Japanese supervision and protection, it is not likely that she will resume her purchases from the countries that forced her to take this step.

Although Japan cannot produce certain kinds of chemical dyes, she is able to supply most of her requirements. In rubber, of which she consumes about 35,000 tons, Japan would also be in a bad way under a boycott, forcing her to utilize reclaimed rubber for most purposes. Japanese enterprises in the South Seas produce

considerable quantities of rubber, which however, could not be imported unless her navy also commanded the South China Sea. Granted that this is lost to her, there are many tropical products that will filter in through trading vessels lured by the enormous profits to hazard the risks.

The above analysis of the practical effect of a boycott upon Japan's key industries, tells us that in the main essentials for prosecuting a war she could hold out for a considerable period, if she remains on the defensive. She would not have to dissipate her strength or resources by sending her fleets outside her home waters or the Yellow Sea. One major naval battle in these waters would be decisive and Japan has sufficient reserves of iron, steel, munitions and oil to meet this emergency.

Japan cannot be starved into submission. No enemy fleet would hazard the risk of entering the Sea of Japan to cut her line of communications with the mainland where there is a superabundance of food. Japan may lose her textile markets in other parts of the world, but she would take over the trade of her opponents in Central and North China and Manchuria. American and Indian raw cotton would be supplanted by cotton from Shantung. The biggest loss to Japan would be the American silk market and the mere threat to deprive her of this source of income,

will compel her to redouble her energies to become independent of a market subject to hysterical and emotional control. It is overlooked that the Chinese boycotts of the past decade have been a blessing in disguise to the Japanese, stimulating them to get out and open up other markets for their manufactured products and wherever she has succeeded, it has been at the expense of British and American trade. The real sufferers from China's resort to the boycott against Japan have been those Western nations whose markets in other parts of the world have been invaded successfully by the boycotted nation.

A world boycott against Japan would work out along similar lines though in a more restricted area. Japan would concentrate upon Central and North China and Manchuria and monopolize the trade and development of an empire that would more than compensate her for any losses she may sustain elsewhere. Perhaps the greatest boon the other Powers could confer upon Japan would be the application of sanctions that would hand over to her exclusive exploitation an economic empire that would enable her to become as self-sufficient as the United States. Only the annihilation of the Japanese fleet could prevent this, and, as we have said before, this is another story. Let us boycott Japan and watch the outcome.

Manchurian Mining is Paralysed

What the New Government Could Do

Now foreign capital has been excluded from Manchuria and how the mining industry has been stifled by Chinese legal requirements is set forth in an enlightening article under the title, "Manchurian Mining is Paralysed" published in *The Mining Journal*. This is written by Mr. B. Hayton Fleet, who points out what the new Government of Manchukuo could do. It is as follows:

North Manchuria is rich not only in coal deposits which are, if only inadequately, already being exploited, but in many other minerals as well. The districts of Fugdin and also that of Inangui, situated along the Taonan-Solun Railway, contain the richest deposits of iron ore. In a number of districts of Manchuria, notably in the Three Rivers' district, most valuable deposits of silver-lead ore have been discovered, which are only awaiting to be explored and operated to the benefit of the local silver currency. And last but not least, it is common knowledge that Manchuria is fabulously rich in gold deposits which are worked by most primitive and wasteful methods.

According to the calculations of such a careful scientist as Professor Anert, the Manchurian gold reserves reach the imposing figure of 4,000 metric tons, while other not less authoritative sources put it even higher. In Prof. Anert's estimation Manchuria, of all China, is the country whose resources can really provide a base for the development of a big gold industry, which from the point of view of State interests is a factor of colossal importance, far exceeding all other branches of industry. Even in pre-war Russia, where this industry was admittedly in a state of neglect, it employed 107,000 men almost four times the number of those engaged in the iron industry. Secondly, being mostly carried on in the wildest and least populated regions, it brings them to civilization and facilitates the development of their resources which otherwise may remain unutilized. Thirdly, this industry provides a source for the accumulation of gold reserves whereby the currency of the country is secured, which is an especially important consideration for countries with an unfavorable trade balance.

The statute of the Nanking Government of May in the 19th year of the Chinese Republic undoubtedly represents some progress on old conditions. Yet under Section 5 of this Law, mining rights can only be granted to the "citizens of the Republic of China," preference being given to the local administrative bodies of districts and towns. Thus foreigners are debarred from working the natural resources of the country in their own right. They are, however, allowed to put their capital into joint stock companies, but even this privilege is made subject to such severe restriction

that it seems almost valueless. Thus, by the letter of the law, more than one-half of the total number of shares must be held by citizens of China, who must also constitute more than one-half of the total number of the members of the company. Moreover, all labor must be Chinese and all the most important offices of the company must also be held by Chinese, from which it follows that foreigners may at best control only 49 per cent of the total capital invested. In practice they are put to further disadvantages. The Chinese part, while having the most important offices at its command, seldom troubles itself to pay its share of 51 per cent of the total capital, which is usually done nominally by transferring the mining rights to the company. Here it must not be lost sight of that these rights become valuable only after the preliminary work of surveying and prospecting has been completed. The cost of such work falls heavily on the foreign capitalist, whilst the Chinese gets net profits without having put in a single penny. As an instance of this the case of the Mulin Coal Mines may be mentioned, where, while all the prospecting was effected at the expense of Skidelsky & Co., the profits mostly go to the Chinese administration who have invested nothing, and whose participation in the enterprise takes the form of drawing their salaries and cashing dividends. Thus the Chinese have all the rights without risking a cent of their money, while the foreign investors, besides having contributed the capital, find themselves, should the business become prosperous, under the menace of the Chinese, exercising under different pretexts the preferential rights of the local administrative bodies and taking over the whole property. But the above are not all the disadvantages the foreign capitalist is confronted with, should he venture to invest his money in the development of the mineral wealth of the country. While by decrees from Nanking, the superior posts must remain under Chinese control, all minor technical posts must be distributed on a strict parity basis. This is highly detrimental to the efficient management of the enterprise as the Chinese, true to their traditions of nepotism, give the jobs to many incompetents, who claim their part in the administration without possessing the necessary qualifications.

Checks are encountered by the foreign investor at every step he takes and the preferential rights of the administrative bodies are most injurious to the spirit of enterprise since, after costly surveys and development work, he may quite unexpectedly find himself up against a veto of the authorities on whose arbitrary decision it depends to declare the district in question closed to private enterprise. There is still another disadvantage which the provisions of the new mining law contain, in that it limits the

mining rights of the concessionaire to 20 years, renewable under certain conditions for another 20 years, but not longer.

On the whole, the statute of the Nanking Government sacrifices the interests of the State and commerce to fiscal and nationalistic considerations, which is especially hard on such a backward country as Manchuria, so badly in need of great masses of foreign capital, which alone can bring about the realization of her wonderful possibilities.

With the possible exception of coal, the mining industry of Manchuria still remains in a most primitive state and is completely stagnant. Silver, lead and iron, to say nothing of other less abundant minerals, are not produced at all, nor even explored. The output of gold is very meagre as compared with the reserves which Northern Manchuria contains of this metal. The actual figures are as follows: In 1920 Northern Manchuria produced only 300 odd kilos of gold: in 1923 and 1924, leaving out the output of two firms who had by mere chance struck rich gold veins, the figure for all other numerous gold mining concerns did not even reach 200 kilos. Prof. Anert estimates that the output with the archaic methods of the past should be at least three times as great.

As regards geological surveys, even the preliminary ground survey, not to mention the mining survey, has not been carried out in the gold bearing areas of Manchuria located in Heilungkiang Province and in the north-eastern part of Kirin Province (the so-called "new areas," where practically no prospecting has been done so far). Nothing has been done in Fengtien Province and in the middle and southern part of Kirin Province.

The areas so far predominating are the so-called "old areas," where only rich ores can be worked, as the poorer ores would require the establishment of large plants with dredges or other up-to-date mechanical equipment.

Broadly speaking, mining in Manchuria is very badly organized and operated. Even the biggest coal mining concerns, such as Haigan or Nai Tze Shan, on the Kirin-Dun Hua Railway, do not employ experts, notwithstanding the fact that there are many recognized specialists in Harbin alone. The management of the mines is always changing hands, which results in a complete change of personnel every time; the new administration putting in their own people. One of such administrations, ignorant of the most elementary principles of mining and neglecting to estimate the coal reserves, had, without due examination, recently spent huge sums for re-equipping the enterprise with new machinery and had already built new foundations required by such installation, when suddenly it abandoned the whole scheme which was to cost millions. It transpired that one of the directors had become associated with a large foreign firm and, successfully passed an equipment scheme through the Board, which would have been too much even for such a large concern as the Moulin Coal Mines, where coal reserves are very closely estimated by prospecting and development.

Matters are even worse in the case of gold mining which, without exception, is carried on by primitive and wasteful methods without any records of the output being kept. Conditions are at their worst in Heilungkiang province, where all normal activity is stifled by the control exercised by the Bank of Tsitsihar.

Only indirect ways are open to those foreigners who desire to invest their capital in the development of the local gold mining industry, and who find their plans blocked at decisive moments by the Chinese administrators. The attempt of De-Voos, the representative of a British concern and the builder of the Port of Hulutao, who hoped to obtain concessions in North Manchuria in return for his services to the Central Government, ended in failure. He had planned to form a group of Chinese concessionaires who would subsequently lease their rights to him, so that the application of the perilous principles of parity and of preponderance of Chinese-owned capital, if only nominal, might be avoided.

Another, probably the most determined factor, with which the concessionaires have to reckon, is the banditry which has already developed to a very great extent in North Manchuria. To ward off this danger it was necessary either directly to negotiate with the bandits and pay them regular tribute, or organize a very costly guard service, which a small business cannot afford. The firm of Skidelsky, when the business was in its prospecting stage, used to pay "squeeze" to the leaders of such bandits, but after the Government began to participate in the enterprise, such

negotiations were discountenanced and a protective force was organized which, besides being more expensive, proved to be less efficient in practice.

Besides these overhead expenses the gold miner of North Manchuria was always called upon to contribute to local provincial budgets, not an inconsiderable item, the more so as these levies were always of an arbitrary nature, the amounts depending on the appetites of the authorities.

To put it briefly, the path of the mining concessionaire has been beset by unforeseen expenditure and other difficulties, which naturally tend to deter the foreigner from the exploitation of the resources of Manchuria, which hitherto remain, in a majority of cases, almost intact.

To change this deplorable state of affairs and to bring about the development of the local mining industry by attracting foreign capital, the Government of the new State of Manchuria-Mongolia will do well to give effect to the following suggestions:—

1. Reorganize the service of the inspection of mines by increasing the technical staff, and reducing the number of members with purely police functions.
2. Abolish all restrictions regarding nationality.
3. Facilitate credits by establishing longer terms of tenure and not limit it to arbitrarily fixed periods.
4. Open to private enterprise all districts and zones hitherto closed.
5. Eradicate banditry.
6. Build up a uniform system of taxation.
7. Provide for methodical ground surveys and geological surveys.
8. Foster the colonization of the important districts and provide them with means of communication.
9. Exempt from all duties such machinery and goods as are necessary for the growth of the mining industry.

Annam Port Improvements

To provide outlets for the increasing agricultural production in Annam, it is proposed to modernize several of the ports, says *Reuter's Trade Service*. The ports in question are Tourane, Vinh-Benthuy, Qui-Nhon and Nathrang.

Tourane is the most important port in Annam, since it is used by European ships and coasting ships that go as far as Hong-kong. In 1928, 608 ships, of a total tonnage of 1,231,000, used the port, carrying goods weighing 101,000 tons, half of which were exports. The port's sheltered position is another reason why the large shipping companies make it a port of call. It is proposed to construct a large and deep anchorage on the right bank of the river Cam-Lé, so that big ships will no longer have to anchor in the bay. The port will be connected with the town of Tourane and the railway by a bridge over the river. The estimated cost of the whole work is 5,600,000 piastres.

Only coasting vessels use the port of Vinh-Benthuy. This port is about 20 km. from the sea, on the Song-Ca river. A branch-line connects it with the town of Vinh. Until traffic justifies the expense of transforming the port, only periodic dredging will be carried out at a cost of 100,000 piastres a year. This work will allow access to ships drawing 5 m. It is proposed, ultimately, to construct a canal, at a cost of about 10,000,000 piastres, flowing into an outer port on the coast.

Owing to the expectation of increased traffic at the lagoon port of Qui-Nhon, berthing space is to be provided in the lagoon, and the access and anchorage improved. It is also proposed to construct an outer port.

To attract ships following the great Far East route to French Indo-China, it is intended to make great improvements to the port of Nathrang, including the construction of a dam between one of the islands in the bay and the mainland, thus affording shelter for the ships, berthing space, and later on, if traffic is sufficient, a very deep quay.

Gettysburg—Port Arthur

By GEORGE BRONSON REA

THREE years ago, motoring from Washington to the summer home of the Japanese Ambassador in the Blue Ridge Mountains, I made my first visit to Gettysburg. It was a glorious summer day and as I wandered slowly along the shaded roads and flower lined paths, standing silently before the statues and memorials to those who gave their lives that the Union might live, I came at last to the central form where Lincoln had stood to give utterance to those immortal words, "that these dead shall not have died in vain; that this Nation, under God, shall have a new birth of freedom, and that the government of the people, by the people, and for the people, shall not perish from the earth."

As I stood uncovered in silent homage to those who made the supreme sacrifice in order that the Nation might survive, I looked across to the "bloody" angle which marks the farthest north of the Confederate advance and I understood what it all meant. The sacrifice had not been in vain. Those who came after had carried on, grateful to those whose names are engraven on the hearts of all loyal Americans and whose deeds will ever prove an inspiration for a posterity that will hold what was secured at such a terrible cost.

That evening as I sat with Ambassador Debuchi, I conveyed to him something of my emotions and impressions of the day, and as I concluded he said, "You have visited Port Arthur and will now understand exactly how we Japanese feel as we bow in reverent homage before the shrines and the monuments scattered over the hill-tops and hill-sides marking the last resting places of those who died that Nippon might live."

Yesterday, (May 22), after two weeks with the League Mission in Harbin, I motored out from Dairen to Port Arthur and with the events of Manchuria and Shanghai before me, I saw the place in a different light. As we passed through the main street of the old town my mind went back to that November morning in 1895 when the world was horrified by the news of the massacre at Port Arthur.

My old friend and colleague, "Jim" Creelman had shared the fortunes of the Japanese army from the commencement of the war in Korea, and many times afterward I listened to his graphic story of the end of that conflict. Two days before the final assault and taking of the citadel, a company of Japanese infantry got separated from the main command in a deep gully and were surprised and surrounded by an overwhelming force of the enemy. The Japanese surrendered. The name of the captain is written large in Japanese military history, remembered by every officer and man in the Imperial Army. The Chinese butchered, disemboweled, mutilated and decapitated their prisoners and left their dismembered bodies strewn along the roadside. When the advancing Japanese troops passed the spot the next day, *they saw their dead*. Then, when

they came to the town, they passed under the heads of their comrades dangling from a bamboo arch thrown across the entrance to the main street.

What followed is history. The Japanese killed every living thing that moved in the town. The Port Arthur massacre is remembered against them while the provocation is forgotten.

The Japanese army has never forgotten. Every officer and every private knows what to expect should he be taken prisoner by the Chinese.

Once again I wandered over the battlefields of Port Arthur making the circuit from 203 Meter Hill to the Bodai, Ehr-lung-shan and other hill-top fortresses. It was Sunday and on every hill were groups of sight-seeing Japanese. As they passed the monuments erected to commemorate the storming of the enemy positions,

they reverently uncovered and bowed low in deep obsequy. Later, as I stood before the simple but impressive Shinto Charnel Shrine dedicated to the spirits of the 21,000 Japanese killed during the siege, I again saw a group approach, uncover, kneel, bow low, rise and slowly pass on. Then I recalled what Ambassador Debuchi had said after I had visited Gettysburg. I understood what it all meant to Japan. It was the same spirit, the same emotions, the same deep gratitude, and the same wave of patriotism that comes over the thinking American as he stands uncovered before the hallowed monuments and the National Shrine at Gettysburg.

The blood of the brave that watered the fields and rolling foot-hills of the Blue Ridge Mountains in southern Pennsylvania and the blood of the heroes who stormed the fortified hill-tops of Port Arthur, brought peace, unity and security to their respective nations. Gettysburg saved the Union; Port Arthur saved Japan from becoming a vassal of Russia. We, in the United States, have rendered grateful tribute in bronze and enduring granite to those who died at Gettysburg. Their names will live forever in our hearts and in the hearts of our children.

"The day may come when the hills of Port Arthur are razed to the ground and the rivers of Liaotung be dried up, but the time will never come when the names of the hundreds of thousands of those loyal officers and patriotic soldiers who gave their lives to their Sovereign and to their country will be forgotten."

It is impossible to understand what the Japanese army has done in Manchuria without keeping this sentiment always in mind. Twice the armies of Nippon stormed the heights of Port Arthur and captured the strongest fortress this side of Suez. Twice they were tricked out of the fruits of their victory through the intervention of foreign powers. China, who allied herself with Russia in order that the armies of the Czar could perform a task they were incapable

LINCOLN'S ADDRESS

Delivered at Gettysburg, Pennsylvania,
November 19, 1863

Fourscore and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battlefield of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this. But in a larger sense we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here, have consecrated it far above our power to add or detract. The world will little note, nor long remember, what we say here, but it can never forget what they did here. It is for us, the living, rather to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us, that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion; that we here highly resolve that these dead shall not have died in vain; that this nation, under God, shall have a new birth of freedom, and that the government of the people, by the people, and for the people, shall not perish from the earth.

of doing for themselves, is again moving heaven and earth to oust Japan from Port Arthur through outside intervention. Once more the Japanese see their security menaced and find themselves caught in a treaty trap which denies to them the right of self-defense, while China and Russia are permitted free scope to prepare for her undoing. The Japanese have broken out of the trap and are making a last stand for their right to exist. Not until the plains of Manchuria are covered with their dead will they evacuate. The sons and grandsons of those who fell at Port Arthur will hold what was handed down to them as a sacred trust, if needs be, against the combined armies and fleets of the world.

Let us leave all legal and political considerations aside for the moment and get down to fundamental human impulses. The Japanese army in Manchuria has its headquarters at Port Arthur. The men are drilled, trained, schooled and maneuvered in an environment which inspires them to heroic deeds. Every time a soldier raises his head he sees battle monuments crowning the hills which surround the town. He visits each week the Charnel Shrine and renders reverent homage to the spirits of those heroes who filled and bridged the moats and trenches with their dead bodies so that their comrades could charge over them to victory. For twenty-seven years the various units of the Japanese army have served their tours of duty at this national shrine of patriotism and sacrifice. During this period the army has not fought a major battle with a foreign foe and the Chinese took it for granted that they lacked experience and dared not fight. The armies of Chang Hsueh-liang were hardened veterans, victors in a long series of civil wars. They had conquered China and had seated their young leader on the old Dragon Throne in Peking, co-ruler of the "Republic." Supplied with arms from the largest arsenal in the world, supported by an air fleet of two hundred planes, and financed from an inexhaustible source of revenue, they considered themselves invincible. They looked down upon the "dwarf" soldiers of Nippon. They ridiculed and insulted them on the streets and jeered and taunted them on maneuvers.

"Ho! Ho! You little monkeys, you don't know how to fight! You haven't fought for twenty-seven years! Look at us, we are real soldiers! We can lick you and make you run." Prominent Chinese civil officials as well as military officers openly advocated war with Japan in public speeches and even at dinners to which prominent Japanese were specially invited.

Never was an army subjected to such humiliation and provocation, and never did an army practice such self-restraint and patience under such insults. The murder of Captain Nakamura and the insincerity of the Chinese over the incident made the situation still worse. The Japanese army boiled with indignation, but their leaders made no move. The grim, silent man at Port Arthur waited, hoping against hope that the Chinese would do the right thing. Then came the incident of September 18. Honjo waited no longer. He pushed the button that started his little army moving. He paid his parting respects to the tablets of those who fell at Port Arthur, took a special train and moved his headquarters to Mukden. He is there yet. He will remain there until his job is finished. The main armies of Chang Hsueh-liang have been driven out of Manchuria. Chang will never be permitted to regain a foothold in the North-east. He passes out of the picture.

Flagrant violation of solemn treaties and agreements, repudiation of honest debts and obligations, outrages and indignities committed upon the persons of defenseless Japanese subjects, continued boycotts and economic disturbances, incitements to disorders and all those other incidents which go toward building up Japan's case against China, pale into insignificance before the insults hurled at an army with fighting traditions such as few nations of the world can duplicate. Human nature is the same the world over. The Japanese army reacted to the same impulse that would justify any group of western fighting men to vindicate their honor in the face of repeated insults without waiting for official approval or a declaration of war.

Treaties, covenants and peace pacts to the contrary notwithstanding, the surest way to provoke hostilities is for the soldiers of one nation to jeer at and hurl insults at the forces of another country which they look upon as the national enemy. The honor and dignity of a nation is not altogether bound up in its respect for and adherence to treaties or international law. Repeated insults to its fighting forces, and the befoulment of its flag, or contumely heaped upon its Sovereign, is a challenge that no self-respecting fighting organization can ignore without dishonor to the nation.

A war started under such conditions is difficult to stop. If the civil authorities intervene before an ample apology is forthcoming, the chances are, even in the home of pacifism, that the administration would be overthrown and the reins of government taken over by the army and navy. Something like this has happened in Japan. Pacifists and legalists may deplore, arraign and condemn the Japanese army, but we venture the opinion that even they would whole-heartedly and patriotically support their own fighting forces if subjected to the same provocation and insult.

It is impossible to understand the psychological forces which impelled the Japanese army to take the law into their own hands without giving full consideration to causes which would undermine the morale of any other body of fighting men, exhaust their patience and cause them to defy a government whose policy of conciliation and peace at any price encouraged the Chinese to further excesses and indignities. No impartial verdict can be arrived at over the merits of the Manchurian dispute without carefully weighing these factors. The Chinese, true to their traditions, interpreted Japan's forbearance as a sign of weakness, a recognition of their superior fighting powers. They became convinced that the Japanese would not fight under any provocation and, Asiatic-like, determined to run them out of the country.

Had Japan petitioned Geneva for protection, China's victory would have been complete. In the roar of laughter, and explosion of mirth, the jibes of the press and the barbs of the cartoonists that would have followed her appeal to the League, Japan's prestige as a World Power and her leadership in Eastern Asia would have disappeared forever. Highly advanced Western nations might with propriety and dignity ignore such insults and provocations and call on the international policeman to abate the nuisance and retain their self-respect. But it would be suicidal for Japan to pursue such a course where China is concerned. Nothing would ever convince the Chinese that the Japanese were not afraid of them. Once China is assured that she has no further fear of Japan, the end of the story is certain. Those of us who live in the Orient, know just how far the United States and Britain will go in upholding their rights and dignity in China. We know just what would have happened in Shanghai the first of the year had not Japan acted as she did last September. We have no illusions about what the end would have been. If we are to sit in judgment on the Japanese army, we must in all fairness to Japan and to ourselves ponder over what would have happened had Japan gone to Geneva crying for help.

Adoption of Feetham Scheme Urged

Lecturing on "Shanghai and After" at the Royal Central Asian Society in London recently, Mr. O. M. Green, formerly Editor of the *North-China Daily News* at Shanghai, traced the growth of the city from the mud flat of 90 years ago, allocated for foreigners' residence, to one of the healthiest, most important cities in the world. Its beginning was a purely voluntary arrangement, foreigners having bought, not taken, the land. All later development of the Council's governing powers is the natural result of right freely accorded by the Chinese to foreigners to manage their own affairs, and of the need of self-defence amid surrounding disorder.

"Chinese politicians," Mr. Green continued, "now demand that Shanghai must be given up to them, on the plea of China's sovereign rights, and have been pushing that demand in many illegitimate ways.

"I think that the Japanese, who are always very well informed, are not a little influenced by uncertainty as to the fear that other powers would agree to abolish extraterritoriality before China is ready for it. Undoubtedly the rule of law has been weakened and the Council's legitimate authority encroached upon in Shanghai in recent years, and in view of the violently divided condition of China the Japanese are determined to establish the security of Shanghai and the suppression of anti-foreign agitation once for all.

"The remedy appears to be in the adoption of Justice Feetham's scheme for the future government of Shanghai, which would preserve Shanghai as an isle of security under foreign protection and save China's face by including local Chinese on an increasing scale in its administration, paving the way to full local autonomy by Chinese and foreigners.

Tsuyoshi Inukai

WITH the death of Tsuyoshi Inukai another great figure is removed from the stage of public affairs in Japan, and a friend is lost to China. Probably no other person alien to China played so important a rôle as did the venerable Japanese statesman in the early activities of the Chinese Nationalists, and no other did so much for the cause of the Revolution. He was a life-long friend of Dr. Sun Yat-sen and that this friendship had held firm through the years was shown some five years ago when he came to China as a mourner to attend the last ceremonial rites for the departed Chinese Leader at Nanking. His real feeling for China and for Chinese aspirations is told best in his own words in what probably was the last document he ever penned. In this he said:

"Few can be more sympathetic towards the Chinese Nationalists and their aspirations than I have been for more than thirty years. When Sun Yat-sen and his associates were exiles among us, hounded by Chinese emissaries and threatened with deportation by our Government, I shielded them. I had once myself been driven out of Tokyo by a reactionary Cabinet when I was in the van of the constitutional movement, and I at once took a friendly interest in these Chinese who sought my help. For a time Sun Yat-sen lived with me. My house was a secret meeting place for the revolutionists. Often they shared my food and clothes and even my meagre income. None could have been more jubilant than I was when the new Republic sounded the knell of the Manchu Dynasty.

"Throughout all the political vicissitudes which followed the birth of the Chinese Republic Sun Yat-sen did not forget me, and continued to seek my counsel. When, in 1923, he invited a Soviet emissary to Canton I cautioned him, feeling that he was making a grave mistake in enlisting 'Red' assistance. He did not heed me. The consequence is the China of to-day, rife with anti-foreignism, harassed by Communist risings, involved in foreign complications.

Voices His Sorrow

"Looking back over thirty years of my friendship with the Nationalists, nothing is so distressing to me as to see our nation forced to launch an armed intervention in their country. This intervention was not started by my Cabinet, it was started by its predecessor. I say this not in a partisan spirit, but because I believe that the hostilities could have been avoided if the party in power before us had taken a firmer stand against China's treaty violation and her encroachment upon our vital interests before the situation became too serious to permit peaceful adjustment. This does not mean that I do not admire the extraordinary tolerance so long maintained by that party in dealing with China's wilful disregard of accepted principles of international amity. But the regrettable fact is that when that policy of toleration has merely invited Chinese contempt of us and has inevitably dragged us into the present deplorable situation, the world remembers little, or has never known anything, about our long years of silent efforts for remaining on friendly terms with China, but hears only the

guns roaring on the plains of Manchuria and on the banks of the Whangpoo River. Surely this could have been forestalled had our diplomacy dealt with China in such a way as would inspire respect, not contempt, for us.

The Washington Conference

"When the Powers met in conference at Washington ten years ago none of them entertained the slightest idea of absolving China of the moral and legal obligations usually observed by all civilized nations in their intercourse with one another. The covenant then adopted was not meant to concede to China unbridled liberty to violate treaties, disregard international obligations, incite the masses against the foreigners through officially compiled school-books and officially subsidized associations. What the treaty meant was to give China an opportunity to put her own house in order without foreign interference. If the Powers did not wish to embarrass China in her period of domestic reform, neither did they wish to be embarrassed by China in the peaceful economic pursuits of their nationals within her borders.

"The Washington treaty was a covenant of mutual forbearance. If the Powers obligated themselves to keep their hands off China's internal affairs, China on her part pledged herself to respect foreign lives and rights. That was taken for granted.

"China could have undertaken the task of internal rehabilitation, if she only had the will, without disturbing the foreigners and foreign rights. To attribute all her domestic troubles to 'alien imperialism' is neither truthful nor manly. Only by admitting her own shortcomings and inabilities and by making honest efforts to remedy them can she become an ordered and efficient nation, and thus win the respect of her neighbors.

"When Sun Yat-sen lived with me I told him that the only sensible way China should follow was the way pursued by Japan. Japan, too, passed through a long period when she had her foreign settlements, her unilateral tariff conventions, her extraterritoriality. How did we rid ourselves of this *imperium in imperio*? Not by inciting anti-foreign violence, but by following a friendly policy toward the Powers. We did not

exploit foreign 'aggression' to conceal our own failings. We frankly admitted the superiority of the western civilization which had imposed alien jurisdiction upon us, and made supreme endeavors to assimilate what seemed to us best in it.

"The existence of a few foreign settlements and of extraterritoriality and a one-sided conventional tariff, though repugnant to our national pride, constituted no serious hindrance to the execution of our program of domestic reform. When we proved ourselves the equals of the Western nations by a wholesale rehabilitation of our own conditions, the Powers gladly welcomed us into their family. This slow, arduous, painstaking work, I told Sun Yat-sen, was the only way to win foreign recognition. But Sun Yat-sen sought a short cut in the 'Red' way. Had he lived he would have realized his blunder.



Tsuyoshi Inukai

Manchuria and Shanghai

"It is matter of profound regret that our intervention in Manchuria and Shanghai has caused so much concern among the Powers with which we wish to be on the best of terms. No nation can be more glad than Japan herself when the regrettable situation is brought to an end. The intervention was not of our own seeking; we were forced to a position where we had no other course. We shall bend all our efforts to bring about its speedy termination. The Shanghai affair was unexpected and accidental; it is not an extension or continuation of the Manchurian intervention.

"Meanwhile the world may rest assured that we seek no special privileges either at Shanghai or in Manchuria. Since the beginning of the intervention we have concluded no new treaties, nor have we secured any new concession. All that we seek is the enforcement of the old agreements which have wilfully been disregarded either by the Nationalists or by the old Manchurian régime, or by both. If we prove ourselves instrumental, even to a small extent, in the birth of a new Manchuria where militarist exploitation of the innocent toilers shall cease, where organized banditry shall no longer murder and pillage, where nationals of all countries may work and trade under the established principles of the open door and equal opportunity, then future historians, far removed from the excitement of the moment, will, I am sure, judge us more kindly than is at present possible. With this firm conviction we face the whole world, unhesitating, unregretting, confident of the ultimate vindication of our case."

The late Premier became head of the Tokyo Government on December 12, and when the assassin's bullet ended his career it brought to a close a half century of public service for the Empire. Mr. Inukai was born in April, 1855, in Okayama Prefecture, second son of Mr. Genzaemon Inukai. While still a youth he was admired for his remarkable intelligence, and at the age of 20 he came to Tokyo to study under the late Mr. Yukichi Fukuzawa, one of the greatest educators of the Meiji era and the founder of Keio University. When the Satsuma rebellion broke out, Mr. Inukai, still a student, was sent as a correspondent to the scene of action by the *Hochi Shimbun*. The reports which he sent back to his paper established him as an able journalist. In 1881 he was appointed a secretary in the Board of Statistics but resigned from that position when the Okuma Cabinet collapsed.

Mr. Inukai then returned to journalism as a member of the *Hochi* staff. He later took part in the organization of the Constitutional Progressive Party and from that time on continued in active politics without a break.

During his long political career he was elected to the Diet 18 times and served as Minister of State three times before becoming Premier. His first major appointment was as Minister of Education in the Okuma Cabinet of 1898; next as Minister of Communications in the Yamamoto Cabinet in 1923, and then in the same capacity in the Kato Cabinet of 1924.

Headed Kokuminto

For a time, when not serving in office, he headed the Kokuminto Party, which no longer exists. In 1922 he broke up this party and organized the Kakushin Club, but his group failed to rise to power. In 1925 Mr. Inukai joined the present Seiyukai, together with his group of 20 members of the Kakushin Club. At that time he was widely criticized for joining the Seiyukai, but this did not seem to bother him.

Following the death of General Baron Giichi Tanaka, Mr. Inukai became the president of the Seiyukai and held that post until his death. His life included the span of years which covers modern Japan, and it is generally conceded that there were few people in Japan with his experience in politics.

The 76-year-old statesman was always associated in the minds of the people with popular government, and for the past few weeks he had been campaigning against the fermentation of anti-parliamentarism which is generally believed to have been involved in the movement which led to the attack on him. The nickname of God of Constitutionalism was given him after his successful battle against the Katsura Cabinet to protect constitutionalism and the abolition of clan politics, which he directed in co-operation with Mr. Yukio Ozaki.

Under the Premiership of Mr. Inukai, the Cabinet faced some of the most difficult problems the nation has known. Following the replacement of the gold embargo and the suspension of note conversion, economic troubles increased, adding to those already created by the Manchurian incident. The Shanghai affair brought a fresh crisis in international relations. The Diet was dissolved

on January 21, and the general elections were held a month later. The Seiyukai won the largest majority ever given one party in Japan. An extraordinary session passed appropriation bills to finance the Manchurian and Shanghai engagements, and another extraordinary session was arranged for May 23 to consider additional emergency measures.

His son, Mr. Ken Inukai, is well known as a novelist, but in the general election in 1930 he was a candidate for a seat in the Lower House and was elected. When his father became Premier, he served as his private secretary. Mr. Kenkichi Yoshizawa, former Ambassador to Paris and at present Foreign Minister, is a son-in-law of the Premier.

To Promote Projects in China

That major British engineering interests have confidence in the future of China and are giving keen attention to questions having to do with the future development of the country is disclosed by the action of a group of leading firms that represent the whole field of heavy engineering in forming an organization to promote engineering enterprises in China. This is set forth in a *Reuter* dispatch from London under date of May 27, which reads as follows:

The formation of a company with a view to promoting the development of large engineering projects in China by eight well-known British engineering firms, was announced in *The Times* to-day.

The journal says that the new combination, which will cover almost the whole field of British heavy engineering, will be called "Dorman, Long and Associates (China), Ltd."

The company will include in addition to Dorman, Long and Co., Ltd., Metropolitan-Vickers Electrical Export Co., Ltd., Babcock and Wilcox, Ltd., Callender's Cable and Construction Co., Ltd., John I. Thornycroft and Co., Ltd., Beyer, Peacock and Co., Ltd., Tilbury Contracting and Dredging Co., Ltd., and the Edgar Allen and Company groups.

The combined resources of these companies in technical information and advice will be placed at the disposal of the authorities in China with a view to bringing public works to fruition.

It is also expected that the combination will facilitate the financing of large schemes.

Confidence in the future of China under a stabilized political régime was expressed to *Reuter* by an official of one of the leading companies concerned in the new group.

It is stated that Mr. Frank Freeman, who visited China on behalf of Messrs. Dorman, Long and Co. last year, is returning there shortly to have a final consultation with the representatives of the other firms concerned to enable them to submit a joint offer to carry out in every detail projects of magnitude.

In addition to extensive works, the objects of the new concern will be to improve relations between Britain and China and to draw the attention of the Chinese authorities to the past value of British engineering achievements and the new services which China needs to bring her in line with modern industrial requirements.

Road Construction for Unemployment Relief

Funds amounting to ¥17,610,396 (about \$8,800,000) were set aside by the Japanese Home Department for the use of the Bureau of Public Works in road construction and improvement for the relief of unemployment during the fiscal year 1931-32.

Press notices regarding the extent of the work provided in the program (167.6 miles) and the amount of the funds allotted should not, however, mislead manufacturers of road machinery, as by far the greater part of that work is being done by hand with the sole object of providing unemployment relief. In the course of construction or improvement on the majority of projects observed, manual labor and hand tools are being used almost exclusively, and of equipment being used, all new items were manufactured in Japan.

However, the Japanese Government is apparently proceeding on an extensive road-improvement program in order to meet the demands of increased numbers of automobiles and trucks, and when the present depression has passed it is thought and hoped that there will be a tendency toward the use of American machinery and methods. The present officials seem to be interested in this and appreciate receiving all the information available on American methods of construction and maintenance.

British Trade Developments in the Far East

SIR JAMES LITHGOW, in his presidential address at the annual meeting of the Federation of British Industries recently, showed plenty of faith in the potentialities of the British Empire in helping to alleviate, if not to cure, the economic disease which is holding in leash the trade of the world. Certain essential conditions must be fulfilled before the expectation can be more than a hope, and among these he places first a whole-hearted co-operation of Empire forces, a national policy which aims at stimulating instead of hindering industry in Britain by restrictive legislation, and a policy of retrenchment in national expenditure which will remove the heavy burdens of taxation and allow for a plentiful supply of capital so needed for the expansion of business in every direction.

He is convinced that the fiscal changes which have been brought about will work to the advantage of the nation, and it is now necessary that the tariff system be given a fair trial over a considerable period in order that both its advantages and disadvantages may be fairly judged in the light of experience. "For better or for worse," says Sir James, "the operation has now been performed."

Meanwhile, it is interesting to observe trade already on the upward trend for the first quarter of 1932, with the possibility of a substantially improved export trade for the whole year. In one direction at least—the very modern sphere of aviation—Britain's position as the world's largest exporter is being well maintained. Official returns just issued show that British exports of aircraft and aircraft parts and material exceeded those of any other country last year. The figures, however, are not fully revelatory of Britain's position in the world's aircraft industry, for they take no account of the manufacture abroad, under license, of many types of British aircraft and British aero engines. No other country's aircraft are so well represented in this way.

No sort of analysis is afforded of the types of aircraft exported, but in general it may be stated that in British exports military aircraft are a somewhat bigger proportion than in those of other exporting countries. German aircraft exports are entirely in the commercial classes as a result of the restrictions placed on the construction of weapons of war in that country. The following are the official figures of the exports of the four chief countries:—

	1929	1930	1931
United Kingdom	£2,158,667	£2,049,921	£1,861,467
United States	£1,881,514	£1,811,975	£1,062,050
France	£1,853,900	£1,850,400	£1,252,900
Germany	£238,940	£312,700	£980,000

The French and German figures are for eleven months, but they clearly show a decline in French and an increase in German exports.

A large consignment of Hermes aero engines has recently been delivered in China and more are being built for the Far Eastern market. This is one of the most important types of export engine for light planes.

Development work is now well advanced on the production of a new version of the Cirrus Hermes aero engine, a new version of the Hermes. The new engine has not yet reached the stage of type tests, but preliminary tests encourage the hope that the Hermes II will be outdone in power. Moreover, the new engine will be slightly lighter than its predecessor. It has already been flown in a Spartan Arrow and has given satisfactory performance. When it is placed on the market it should appeal to that wide body of flyers who prefer to use ordinary light planes for the large measure of safety they give, but would be glad of higher performance.

In the Leeds engineering industry conditions have recently been brightened by the receipt of a useful order for a dozen locomotives for China by Kitson and Co., Ltd. This has necessitated the recalling of a number of employees who had been temporarily suspended. A certain amount of new work is also going on in the heavy tool machine departments for the Far East, while a slight improvement is also taking place in the textile foundries for new machines and also for spare parts.

A novel use of horizontal prime movers not often discussed in marine circles is for driving tin dredgers, for which purpose an equipment has been recently supplied by the Premier Gas Engine

Co., Ltd., Nottingham. The vessel in question is the Cambria, and has been constructed to the order of the Tavoy Tin Dredging Corporation, of London, by the Werf Conrad N.V., of Haarlem, Holland. The power plant comprises two Crossley-Premier multi-cylinder gas engines, one of 400 b.h.p., and the other of 200 b.h.p., developing their power through the medium of suction gas supplied from a Crossley wood-refuse fuel plant. After being completed in every respect and tested off the coast of Holland, the dredger was towed to the operating zone in the Federated Malay States.

Another interesting order, obtained quite recently by Swan, Hunter, and Wigham Richardson, Ltd., Wallsend-on-Tyne, calls for the construction of a twin-screw train ferry designed to carry passenger and freight trains across the Yangtze River between Nanking and Pukow.

The negotiations in China were carried out by Malcolm and Co., Ltd., Shanghai, acting as agents for the shipbuilders. The ship and propelling machinery will be built at the Neptune Works, Walker-on-Tyne, under the supervision of Sir John H. Biles and Co., consulting naval architects.

In connection with rail transport, it is interesting to note that Colonel T. A. Hiam, assistant to the president of the Canadian National Railways, who has been invited to act as technical adviser for railways to the Manchurian Commission, has had a wide experience of international communications in different parts of the world. He was military director of the Anatolian Railway (Bagdad Railway) after the Armistice, and was a member of the Allied Railway Commission in Constantinople. He was technical adviser for railways at the League of Nations from 1920 to 1929. In 1922 he visited Spain in connection with the drafting of the International Railway Convention, and in 1925 made a trip to Russia with Sir Donald Mann, who had been invited by the Soviet Government to advise it concerning a grain elevator system. Colonel Hiam was attached to the Upper Silesian Commission which was connected with the reorganization of the Polish and German railways in that part of Europe. He also served with the Commission relating to the dispute between Lithuania and Poland concerning the outlet to the Baltic. In 1929 he represented the League of Nations' Transport Section at the conference of the International Railway Union in Naples.

Several important orders have been booked for India and Russia during the past few weeks. Fortunately, the fears which were expressed in the House of Commons about a Congress boycott of British mill machinery for Ahmedabad have proved groundless. The orders totalled about £270,000, and it may be recalled that the new mills which ordered the machinery from British firms in Bombay and elsewhere deferred delivery on the ground that they were being coerced by Congress. They pointed out that it was doubtful whether anybody could be found to erect the machinery even if it were delivered. The problem, however, has now been surmounted.

One of the largest Russian contracts recently placed in Britain was obtained by R. Hoe and Co., being for 21 super-speed newspaper printing units, approximating £100,000 in cost. Advances have also been received that the Russian Government is to spend £300,000 on a large factory for the manufacture of irrigation equipment. The sum of £200,000 is also to be spent on plant for the manufacture of welding equipment and commercial acetylene and oxygen.

In face of unusual difficulties the British electrical equipment industry is making a bold bid to extend its overseas trade. Special attention is being given to the development of Far Eastern markets. At present the British Electrical and Allied Manufacturers' Association is working out a complete and detailed scheme of Imperial co-operation which will be discussed at the Ottawa Conference. As the Empire is the outlet for about 50 per cent of Britain's electrical exports, the scheme now in course of preparation is fraught with big possibilities. It will cover Canada, Australia, New Zealand and India and possibly other colonies. It will contain suggestions for the exchange of research and patent experience, pooling of statistical information, exchange of engineers and similar rationalizing measures. The British industry is hopeful that the Continental hold on foreign markets will be substantially weakened by the steps now being taken to secure first-hand contacts overseas.

"Patriotism" Air Squadron

By EISABURO KUSANO

A PLAN is now under way in Japan to establish what will be called the "Patriotism" Air Squadron, consisting of "Patriotism" airplanes which have been and still are being built with funds donated by the public to the Imperial Army. The plan is advocated with unusual enthusiasm among officers of the War Office and the General Staff Office, and arrangements are being made under sponsorship of the War Minister, Lieut.-General Sadao Araki. There is a possibility that the "Patriotism" Air Squadron will be established at Tachikawa, near Tokyo, (the former Tokyo airport), to defend the capital. At present, there is the 5th Air Squadron at Tachikawa but the squadron is to remove in the near future in consequence of the proposed Army Reorganization readjustment.

It is further planned that the army aviators of the "Patriotism" Air Squadron will be made up of the pick of all the air forces in Japan, not only from the viewpoint of their aeronautical skill, but also their good conduct, so that it will become the flower of all Japanese air forces. The "Patriotism" Air Squadron will also be equipped with the latest types of army flying machines as well as those now under construction through public donation of funds. If and when the "Patriotism" Squadron is organized, Japan's capital will be well defended against any aerial invasion.

Twenty-one "Patriotism" airplanes, made up of light bombers, battleplanes, and reconnaissance planes, were completed by the end of April, 1932, and it is expected that altogether 64 or more of them will be dedicated to the army in the near future.

This contribution of funds to the army was made in the wave of patriotism following the outbreak of the Manchurian incident at Mukden in September, 1931, and especially after the army built two aircraft, a Junkers K-37 type bomber, named the "Aikoku" (Patriotism) Airplane No. 1, and a Dornier-Mercure hospital ship, called the "Aikoku" Airplane No. 2, at the cost of Y.120,000. The disbursement of Y.120,000 was made out of the army funds which had accumulated since the War Office commenced to accept public contributions "for encouragement of the theoretical and technical study" some years ago.

The nation was then stirred by the desire to donate more "Aikoku" airplanes, especially after these two machines were sent to Manchuria at the beginning of 1932 to engage in the expeditionary operations there. A nation-wide movement was then started to raise funds. Even primary school children participated in the enterprise, little boys and girls offering one sen each out of their small savings, while many boys offered their services in selling pencils on the street. The contribution of one sen each by the



The "Hokoku" Seaplane No. 1, the first plane donated to the Navy. Built by the Kawanishi Aircraft Company of Naruo, half way between Osaka and Kobe

primary school children from all over the country totalled nearly Y.200,000 at the end of April, 1932.

The public donation of funds to the army, the receipt of which was acknowledged by the War Office, exceeded the Y.1,000,000 mark early in April, 1932. It was then announced that Y.1,077,000 had been paid for the construction of three reconnaissance planes, seven battleplanes, and four light bombers, while approximately Y.200,000 was spent in the purchase of other kinds of arms, including one war-tank, two infantry guns, eight heavy machine-guns, eight light machine-guns, 10,000 army steel helmets, and so on.

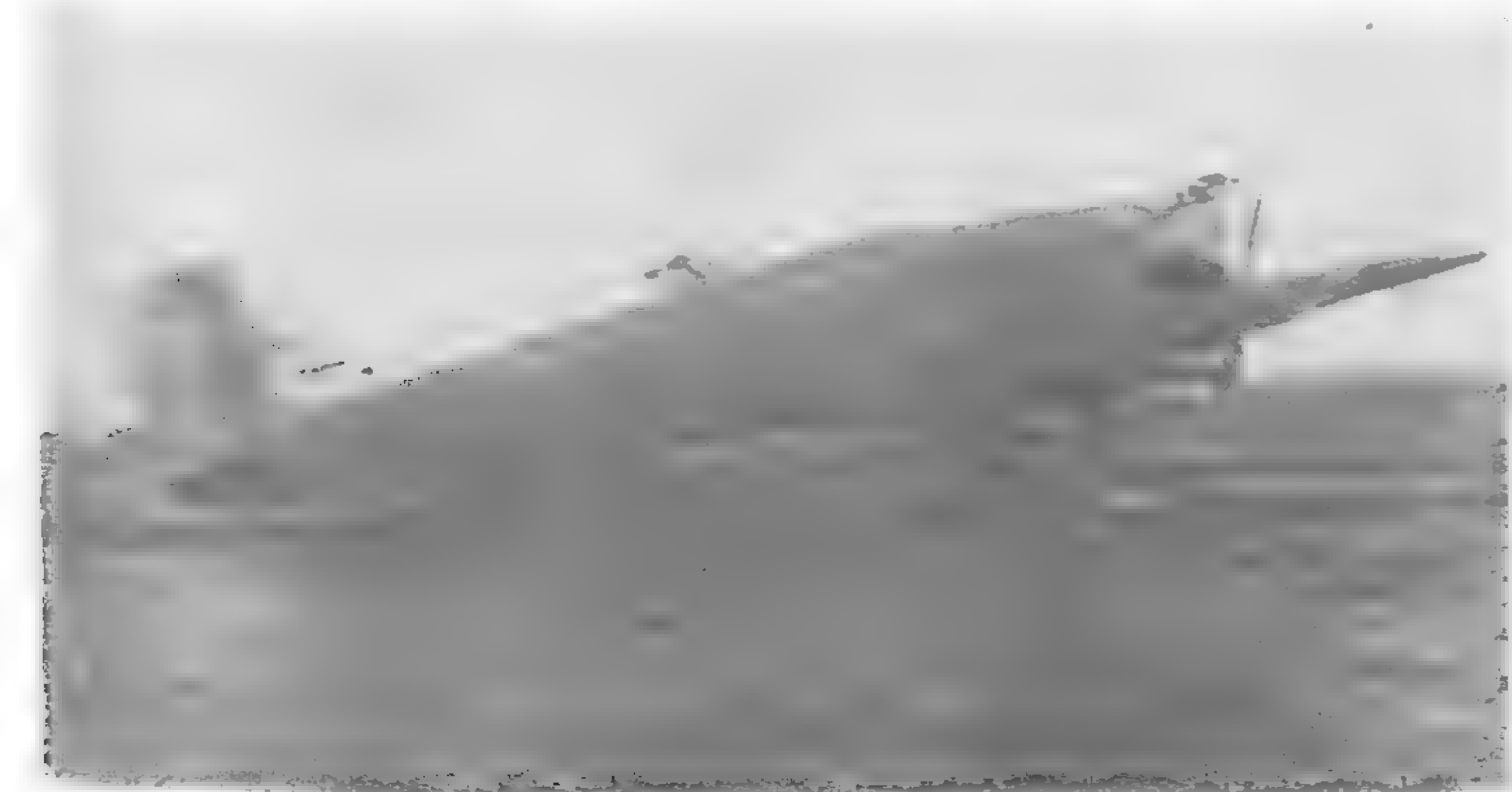
The war authorities, by way of giving the public donors of funds a general idea of how much airplanes, armored cars, machine-guns, and other kinds of arms cost, published a list of desirable arms with the prices thereof.

The prices of different types of airplanes listed in this publication was as follows: heavy bomber, Y.200,000; light bomber, Y.80,000; reconnaissance plane, Y.80,000; battleplane, Y.70,000.

"Patriotism" Army Planes

With the exception of the "Aikoku" Nos. 1 and 2, (and two "Hokoku" or National Service seaplanes donated to the navy), all the "Patriotism" army planes built with public donations are divided into four types. They are: the 91-type battleplane, the 92-type battleplane, the 88-type reconnaissance plane, and the 88-type light bomber. A general description of all of these "Aikoku" and "Hokoku" airplanes follows:

The 91-type battleplane: metal, single-seater, monoplane of the high-winged type, built by the Nakajima Aircraft Company, which has factories at Ota, Gumma Prefecture, and at Ogikubo, Tokyo Prefecture; span, 11 meters; fuselage, 7.3 meters; height, 3.1 meters; wing area, about 20 square meters; weight, fully loaded,



The "Patriotism" Airplane, No. 1, a Junkers K-37 Type Bomber, the first of the series whose appearance stimulated the Public to Donate 64 "Aikoku" planes. This Plane was remodelled by the Mitsubishi Aircraft Works, Nagoya



The "Patriotism" Airplane, No. 2, a Dornier-Mercure Hospital Ship, built by the Kawasaki Works, Kobe, which showed remarkable activity in Manchuria in transporting the wounded from the Front Lines to Field Hospitals

about 1.5 tons; horizontal speed, more than 300 k.m.h.; time required in attaining the altitude of 5,000 meters, less than 10 minutes; is equipped with one Jupiter 450 h.p. engine is star-shaped, nine cylinder air-cooled system.

The 92-type battleplane: all-metal, single-seater, biplane, built by the Kawasaki Aircraft works of the Kawasaki Dockyard Company, Kobe; is equipped with one 600 h.p. B.M.W. engine, and has a speed of 400 k.m.h.; it requires 50 seconds to attain an altitude of each 1,000 meters during the first 5,000 meters. Further details are not available.

Both the 91-type and the 92-type battleplanes are the latest addition to the Imperial Army of Japan. Prior to the appearance of these two crack battleplanes, last year, the standard army battleplane was the Ko-4 type craft, equipped with one 300 h.p. Hispano-Suiza engine. These standard planes, however, were found to be obsolete in their capacity as compared with the European and American fighting planes, and therefore, the war authorities requested the aircraft manufacturers of Japan to produce better types in competition among themselves. The Nakajima and the Kawasaki works won the competition by turning out machines which were adopted by the army and named the 91-type and the 92-type planes, respectively.

High speed is the outstanding features of the Kawasaki plane, both in its horizontal flight and in soaring to high altitudes, while the Nakajima plane has revealed remarkable ability in advanced aerial manoeuvres, familiarly known as "stunt" flying. In passing, the fact must also be mentioned that the Kawasaki plane made its first appearance in the "Aikoku" group as the No. 20 plane for Chosen (Korea), built with the donation from that peninsula.

The 88-type reconnaissance plane: metal, two-seater, biplane of which the lower wing is smaller, built by the Kawasaki works, Kobe; span, upper wing, 15.2 meters, lower wing, 13.34 meters; fuselage, 11.28 meters; height, 3.5 meters; main wing area, about 48 square meters; weight, fully loaded, 2.8 tons; horizontal speed, more than 220 k.m.h.; time required in attaining the 3,000 meter altitude, less than 15 minutes; is equipped with one 450 h.p. B.M.W. engine of V shape, 12 cylinder, water-cooled system.

The 88-type light bomber: metal, two-seater, biplane of which the lower wing is smaller, built by the Ishikawajima Aircraft Company, Tachikawa-machi, Tokyo Prefecture; span, upper wing, 15.2 meters, lower wing, 13.34 meters; fuselage, 11.56 meters; height, 3.5 meters; main wing area, about 48 square meters; weight, fully loaded, about three tons; horizontal speed, more than 200 kilometers; time required for attaining the 3,000 meters altitude, less than 25 minutes; is equipped with one 450 h.p. B.M.W. engine of V shape, 12 cylinder, water-cooled system.



A 91-Type Battleplane, one of the latest additions to the Japanese Army, built by the Nakajima Aircraft Works. The picture shows the "Aikoku" No. 7, donated by the people of Gumma Prefecture. It is equipped with one 450 h.p. Jupiter engine which develops more than 300 k.m.h. speed and it takes less than 10 minutes to attain 5,000 Meters altitude. Being capable of performing all kinds of aerial Manoeuvres

Junkers K-37 type bomber: all-metal, three seater, monoplane, imported from Germany and modified by the Mitsubishi Aircraft Company which has two factories in Tokyo and another in Nagoya: this plane can also serve as a reconnaissance plane as well as a battleplane; is equipped with two Jupiter 450 h.p. engines; speed, 243 k.m.h.; load capacity, 1,730 kilograms; weight, fully loaded, 4,300 kilograms; cruising distance, 1,150 kilometers; cruising hours, about six; is furnished with an aerial camera and three machine-guns.

Dornier-Mercure Hospital Plane; metal monoplane, built by the Kawasaki works, Kobe; is equipped with one 450 h.p. B.M.W. engine; speed, 180 k.m.h.; load capacity, 1,200 kilograms; weight, fully loaded, 3,526 kilograms; cruising hours, about five; accommodations, including the crew, for 10 persons.

"Hokoku" seaplane: two seater, two-floats, biplane, a later model of the 14-type naval plane, built by the Kawanishi Air Craft Company, Naruo, Hyogo Prefecture; data on its ability are not available. The measurements are: span, main wing, 14.5 meters; fuselage, 10.5 meters; height, 4.1 meters; weight, fully loaded, 2.5 tons; is equipped with one 450 h.p. Jupiter engine.

In view of the fact that the No. 5 "Aikoku" airplane, a 88-type reconnaissance machine, which was lost after it left the Harbin army aviation ground on the morning of March 30, and was found on the morning of April 8 on a bank of the Sungari River, burned, the donor of the plane, a stock exchange operator of Tokyo, approached the War Office with a proposal to donate another plane to take the place of the No. 5 "Aikoku" plane. This man had contributed three "Aikoku" craft single handed, No. 3, 4 and 5, which are respectively a 91-type battleplane, an 88-type light bomber, and the lost 88-type reconnaissance plane. With the new reconnaissance plane, he has donated four planes to the army.

"Patriotism" Airport

It is also worthy of special mention that an aviation ground was donated instead of an "Aikoku" airplane in Tosa Province, Kochi Prefecture, along the south-eastern Pacific coast of Shikoku Island. Under the joint auspices of the ex-service men's organization, schools, and young men's societies, about Y.80,000 for building an "Aikoku" plane was raised by public donation. Lieut.-General Kawada and Vice-Admiral Otani, of Kochi Prefecture, who were asked their opinion as to what kind of an airplane should be built, consulted together, and decided to recommend that the Kochi people donate an "Aikoku" aviation ground in consideration of the fact that

(Continued on page 246)



The "Patriotism" Airplane No. 6 and 88-Type Reconnaissance Plane built by the Kawasaki Works, Kobe

Light Weight Traction Motors for Shanghai

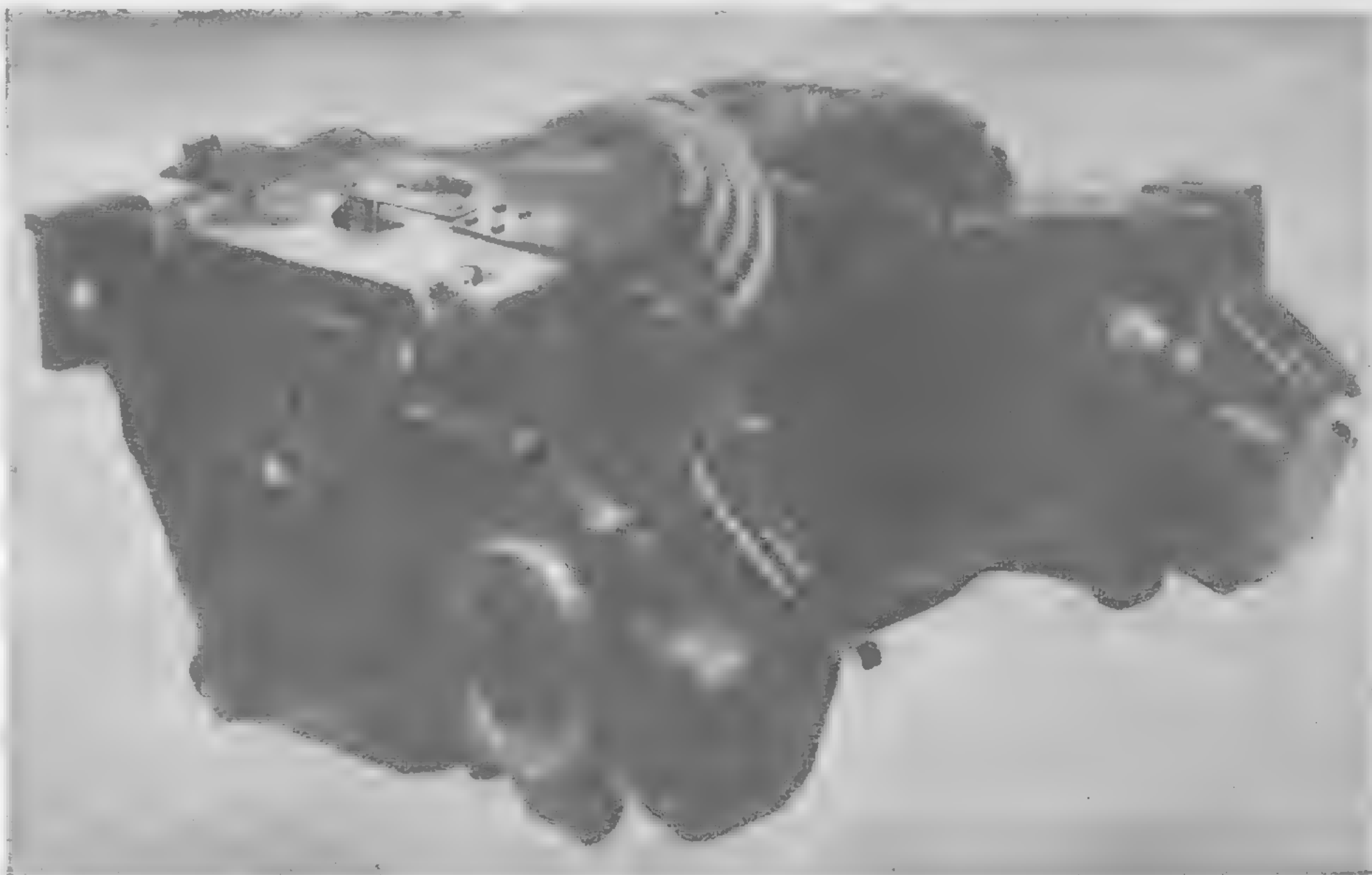
AN order has been placed with the Metropolitan-Vickers Electrical Company by the Shanghai Electric Construction Company involving the supply of 20 light weight traction motors and associated control gear for operation on the Shanghai Tramways system.

The motors, which are continuously rated at 35 h.p., 720 r.p.m., 500/550-volts, are of a type specially developed several years ago to meet the requirements of the Shanghai Electric Tramways and, in general, of all meter gauge tramway systems.

Light weight has been achieved in their construction without any sacrifice of strength or reliability by a design which permits of ventilation; by the employment of higher speeds, made possible by the use of special steel shafts, and of an improved type of pinion enabling higher gear ratios to be used; together with a scientific elimination of unnecessary weight throughout. These features are exemplified in the motors described which have the high gear ratio of 13 to 82, the pinions being housed in a light but strong gear case of welded sheet steel.

Previous to the present order, over 50 M.V. light weight traction motors together with controllers, circuit breakers and similar equipment have been ordered by the Shanghai Electric Construction Co., while throughout the world over four thousand motors of this type are in operation; a very practical tribute to their successful service.

The ten "two-motor" controllers which are being supplied are of the new Metrovick O.K.-B type, in which all circuits are made and broken by means of cam-operated contactors, an



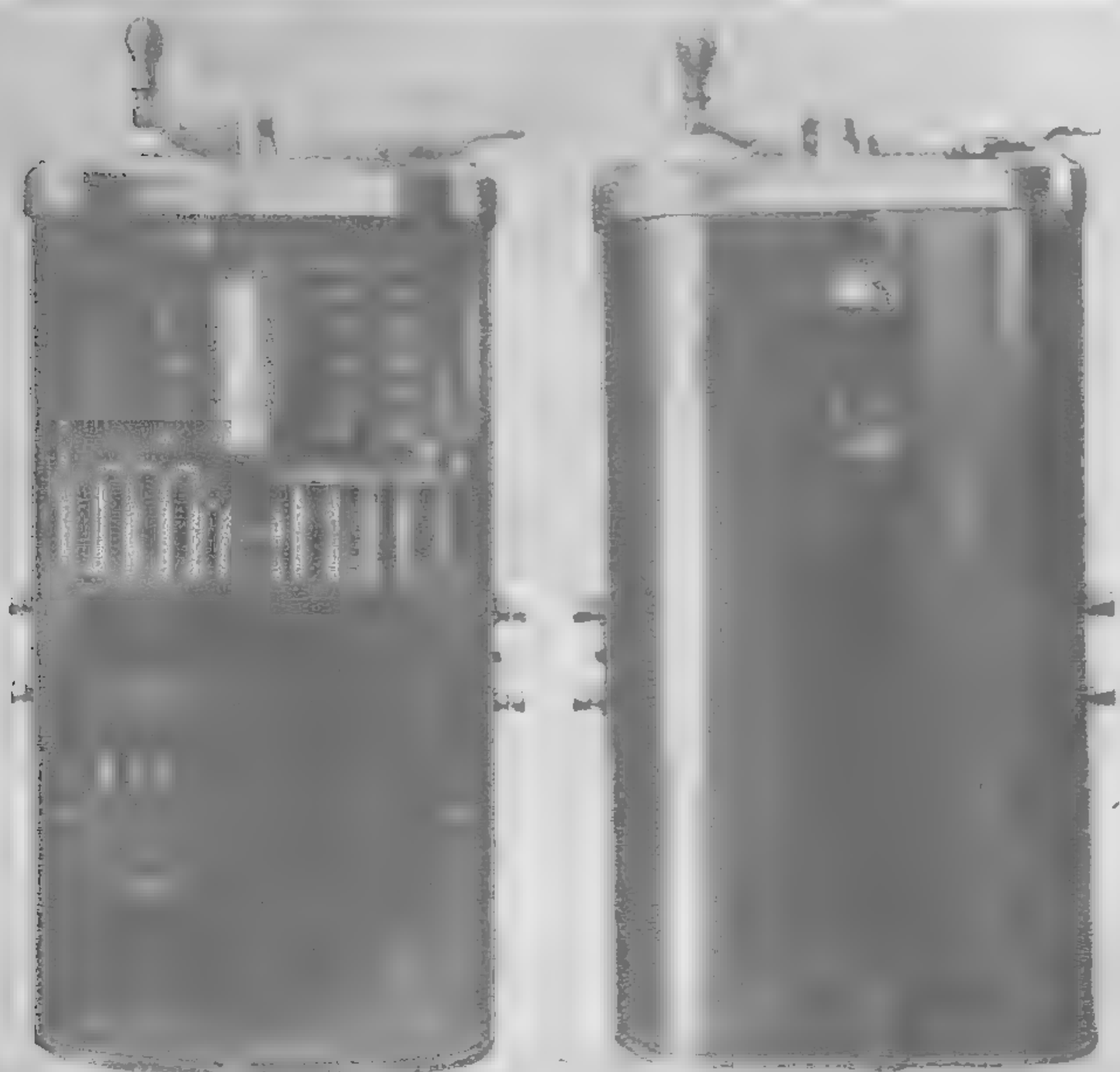
M.V. Light weight Tramway Motor complete, view from Commutator end, axle side



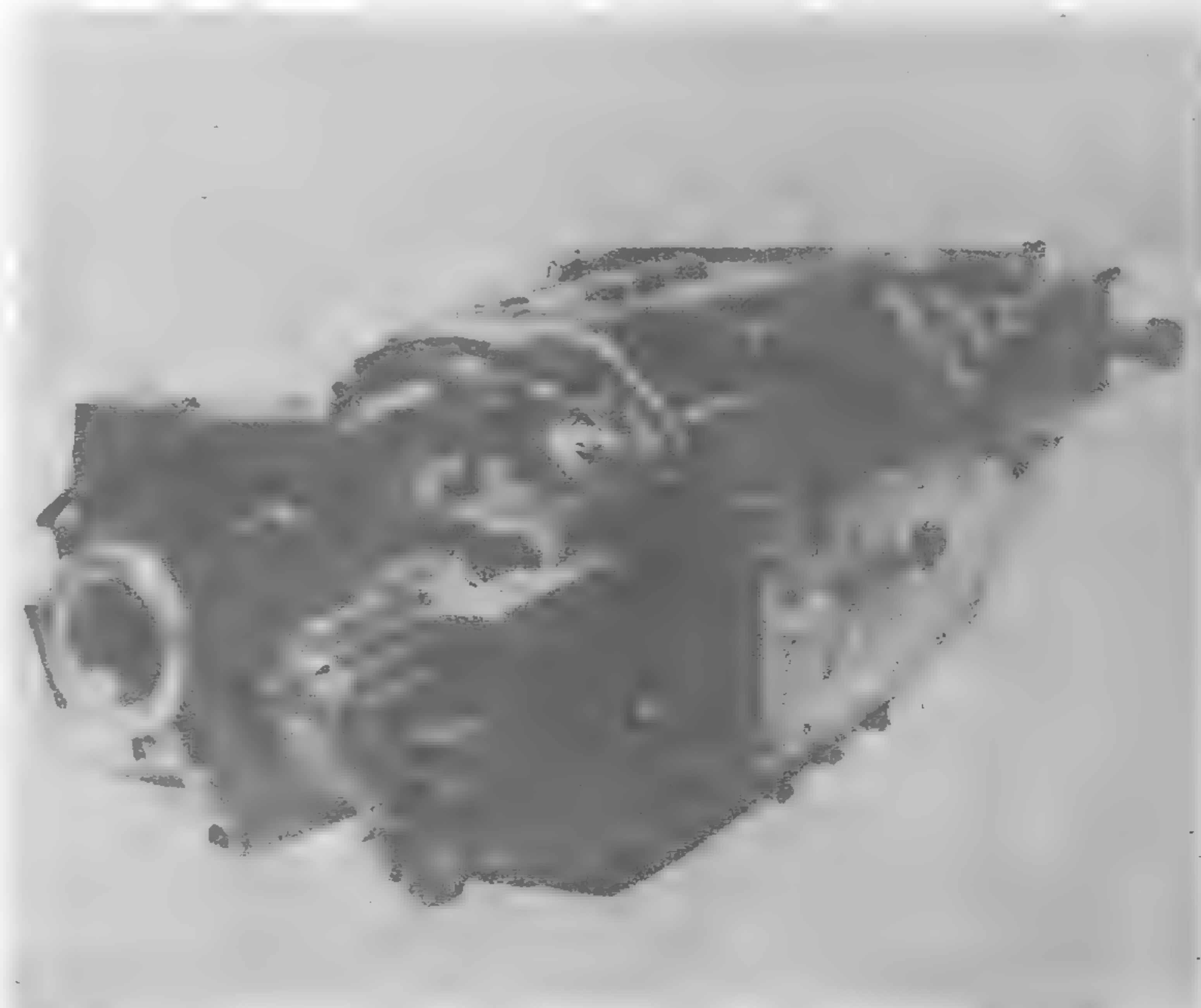
M.V. Tramway Motor Armature

innovation having obvious advantages over the older drum and finger construction.

The previous controllers supplied for the Shanghai Tramways have been of the latter type and have given very good service. The new contactor controllers are nevertheless a considerable advance on the older type, and this order for ten equipments follows the highly satisfactory operation of two sample equipments which were recently given extensive trials on the Shanghai system.



O.K. Type Contactor Tramway Controller, cover on and cover off



M.V. Light weight Tramway Motor complete, view from pinion end, nose side



Picture taken from South-west End of Dam at Opening Ceremony when Reservoir was Half Full

Singapore Municipality Obtains New Water Supply from Johore

Opening of New Reservoir at Pontian Kechil Completes One Stage of Major Engineering Undertaking

FROM the year 1904 the Municipal Commissioners of Singapore had considered the necessity of the introduction of a new water supply in augmentation of their existing supplies which were drawn from sources within the Island.

In 1919 the Municipal engineering staff was instructed to carry out preliminary investigations and surveys of all sources, both on the Island and on the mainland in Johore within a reasonable distance of the area of consumption.

The investigations were carried out and reports prepared under the personal direction of the Water Engineer, the late St. Stephen G. Williams, M.INST.C.E.

In 1922 when the preliminary investigations had been completed, the Municipal Commissioners decided to engage the services of a firm of Consulting Engineers in Westminster to investigate the various alternatives and any others they might suggest, and to recommend which of such alternatives should be adopted, and the firm of Sir Alex. Binnie Son & Deacon was invited to visit Singapore for that purpose, and later was appointed to design and carry out the works described below.

Except to a small extent, all available sources within the Island had already been fully developed and consideration had to be given to various alternative sources on the mainland in Johore.

The existing sources on the Island which had been developed are capable of affording a supply of 12 million gallons per diem,

and the consumption in 1921 when the population was 426,000 persons, was, very approximately, 12 million gallons per diem.

It will thus be seen how imperative it was to embark without delay upon the introduction of a new supply.

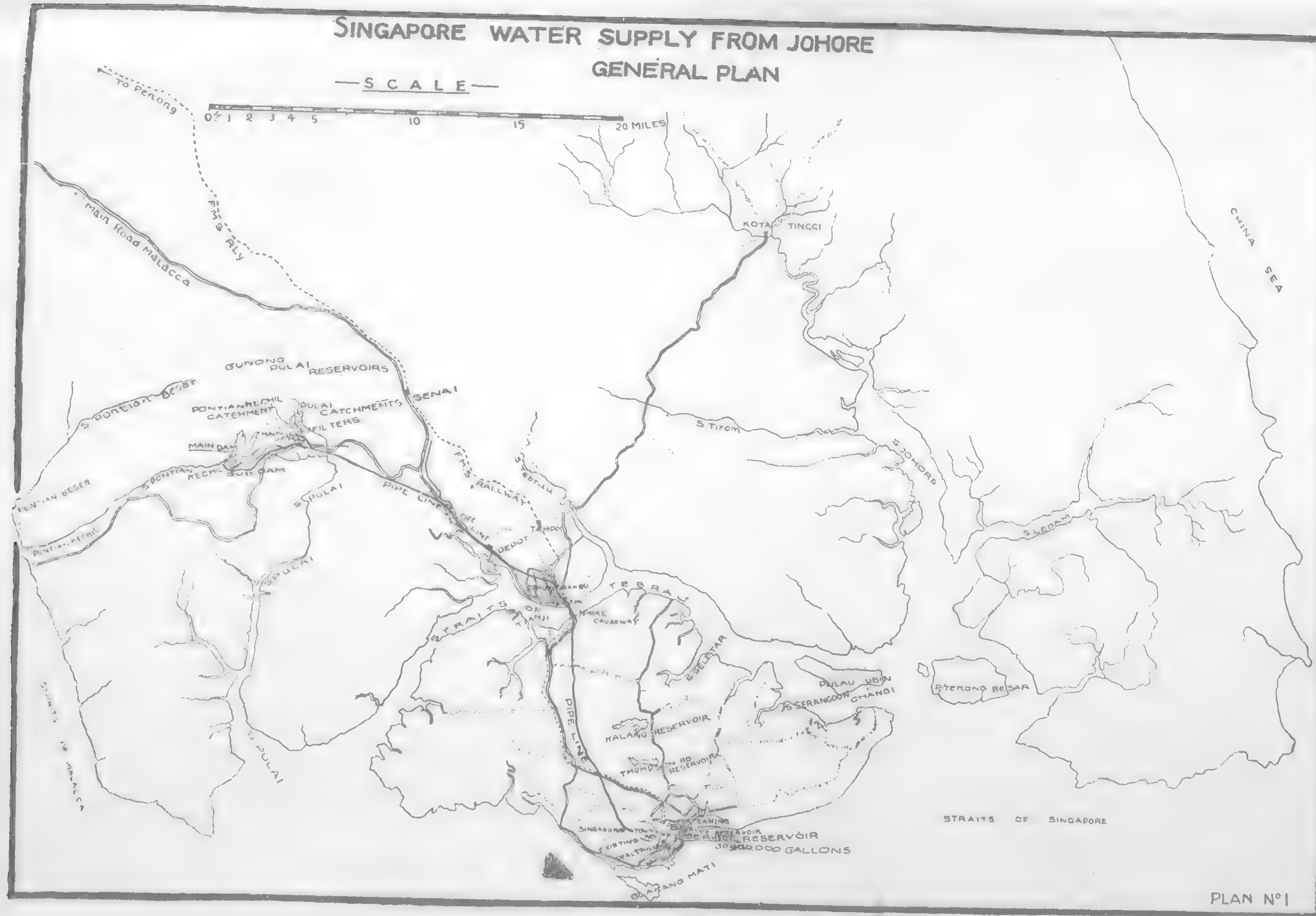
In 1930 the consumption had risen to 17 million gallons per diem and fortunately the new works described in this article had been so far completed as to enable that demand to be met.

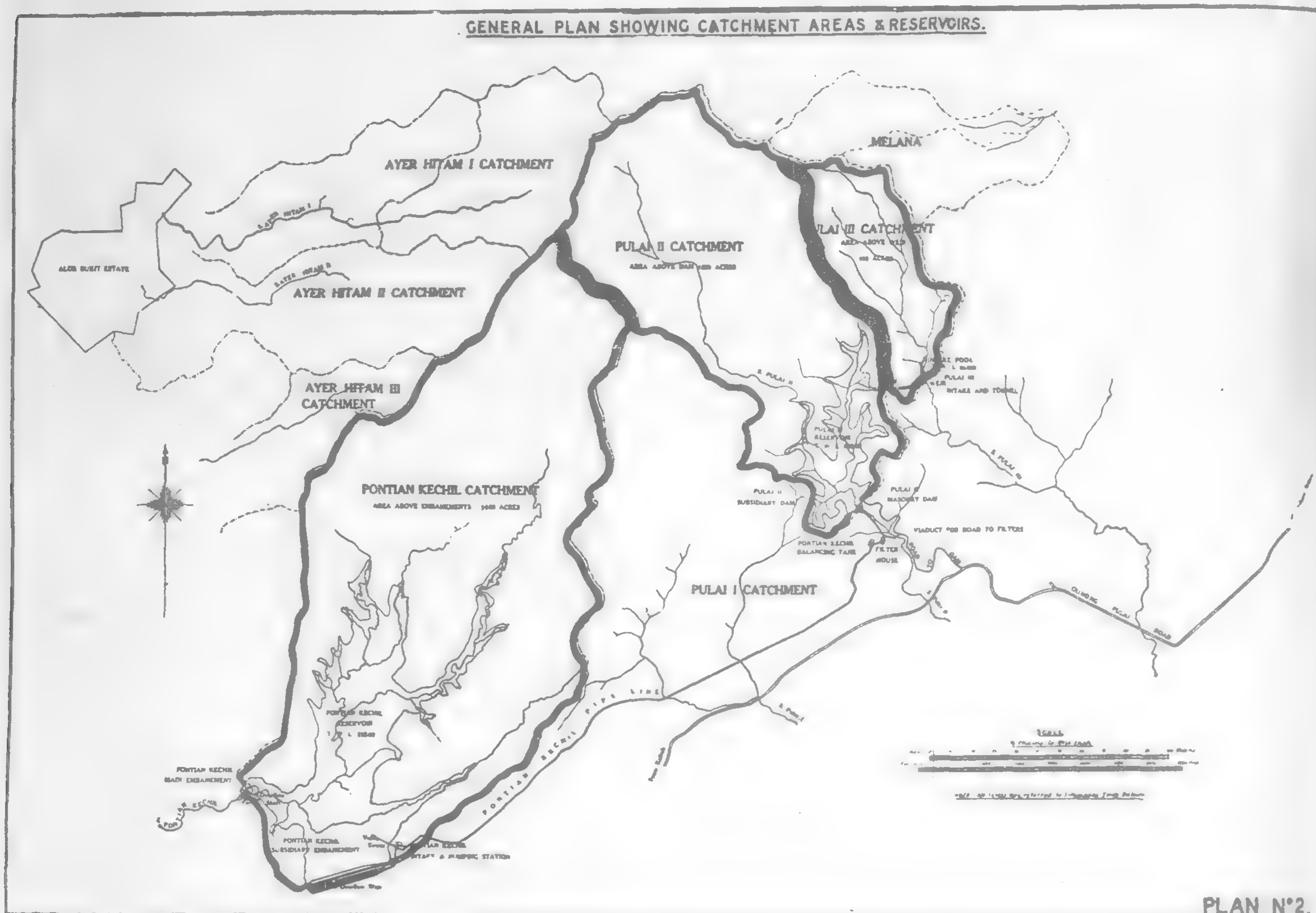
Five alternative schemes were considered and the one adopted is known as the Gunong Pulai and Pontian Kechil, and is divided into three instalments necessitating the construction of two large reservoirs and the interception and diversion of the Pulai III stream to the east and of various streams from valleys lying to the north.

The general scheme is shown on Plan No. 1, while the reservoirs are shown to an enlarged scale on Plan No. 2.

Instalment No. 1

This instalment embraces the construction of the Gunong Pulai Reservoir, now known as the "Sultan Ibrahim Reservoir" shown on Plan No. 2 and labelled "Pulai II Reservoir," which was formed by building a masonry dam across a narrow gorge on the Pulai River; a subsidiary dam on the west bank of the reservoir where a depression or "col" in the ground occurred; the driving of a





tunnel from Pulau II to Pulau III to intercept and divert the water flowing from the Pulau III catchment area, the diversion being effected by the construction of a masonry weir immediately to the south of the tunnel through which the water flows to be stored in the Pulau II Reservoir; a pipeline from the main dam to aerating tanks; a battery of filters housed within a concrete building in the position shown upon Plan No. 2, and a pipeline 33 miles in length consisting of lapwelded steel pipes, 39, 36 and 33 inches in diameter respectively from the filter house to a new service reservoir known as "Fort Canning Reservoir," situated on a hill immediately above the town of Singapore.

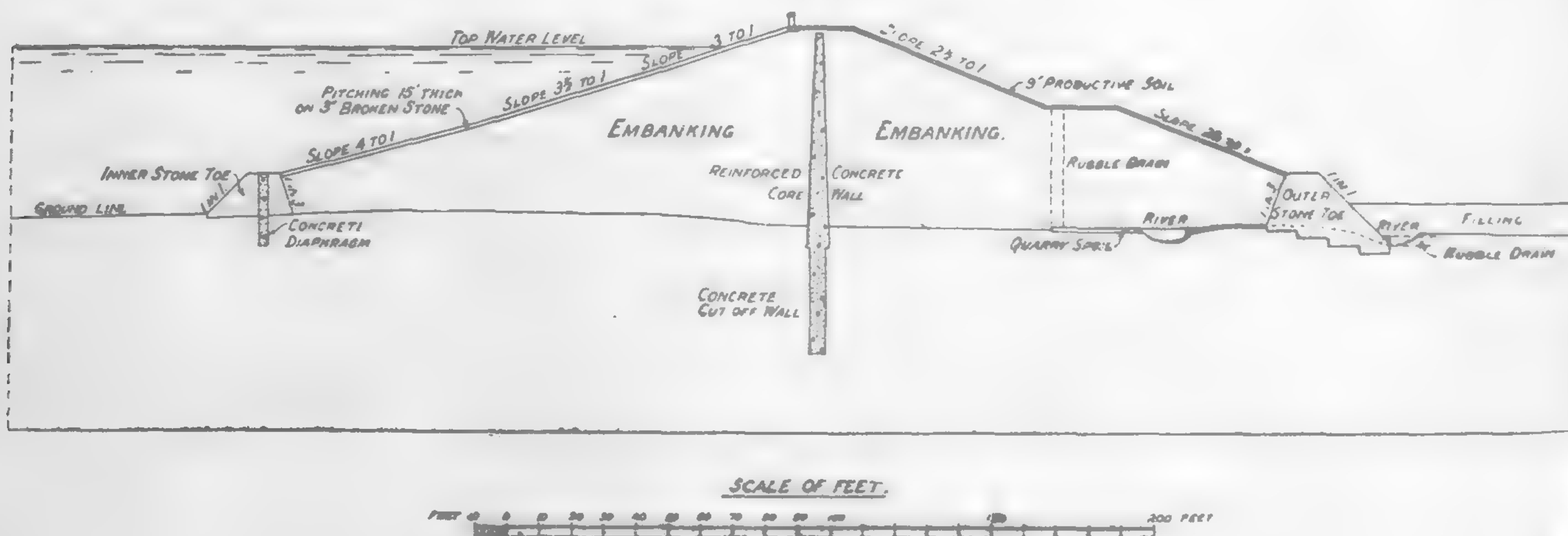
Before any engineering works were embarked upon a road of access $1\frac{1}{4}$ miles long was constructed to the site of the works, and

many months were spent in carrying out anti-malarial works within the Gunong Pulau Valley under the direction of Dr. Hunter, the Medical Officer of Health to the Municipality.

This Valley, situated within dense jungle, was heavily infested with mosquitoes, and the anti-malarial works necessitated the removal of all trees and undergrowth for some distance beyond any point where men would be engaged on the permanent engineering works. The whole area so denuded of trees was effectively drained, and while the permanent works were being carried out, special men were employed on daily tours of inspection to see that all drains were performing their function and to spray with paraffin any damp ground or places where standing water was encountered. Massive granite boulders within the protected area weighing as

PONTIAN KECHIL. MAIN EMBANKMENT.

SECTION 'A'.



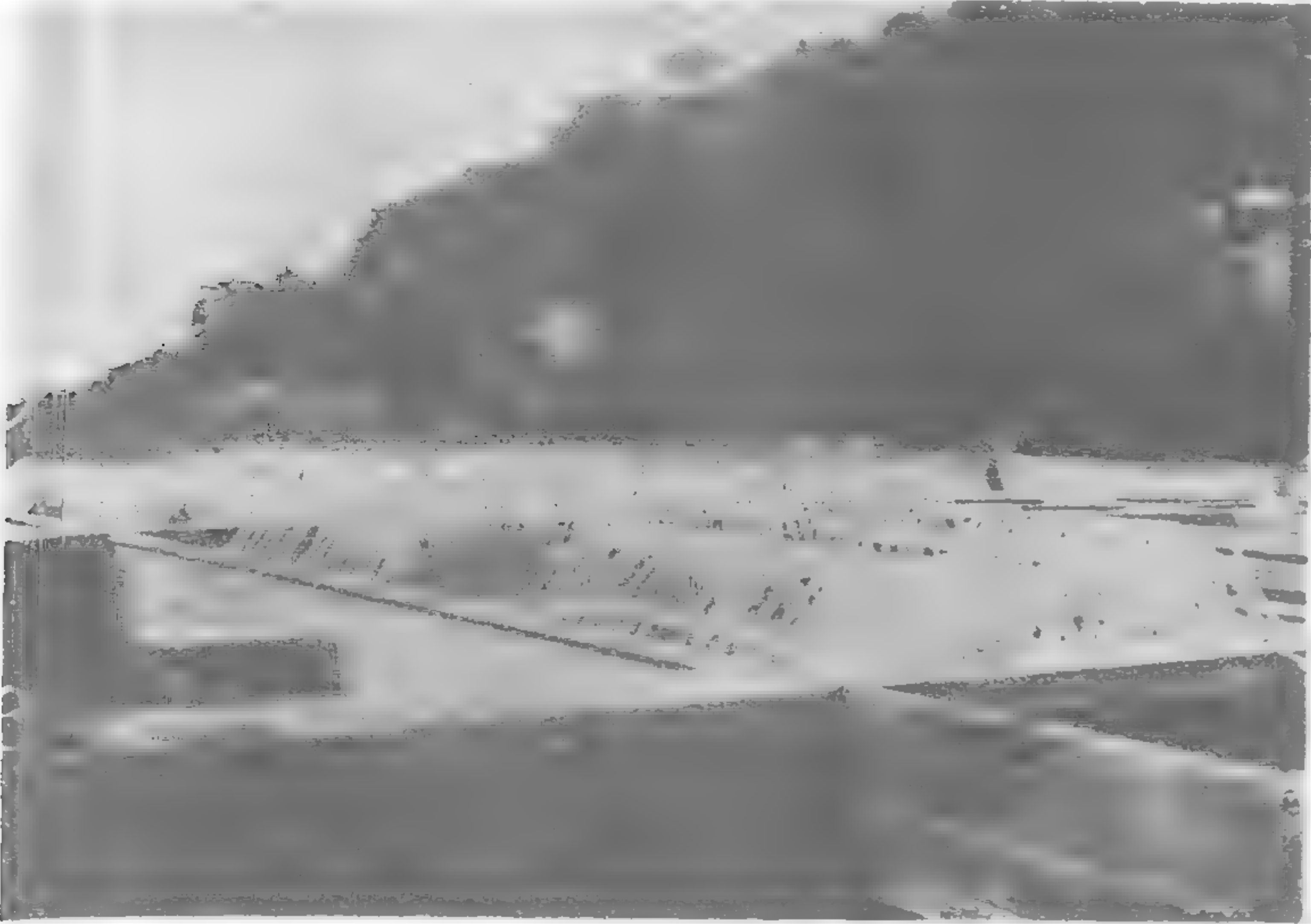


Plate 7—Aerating Tanks



Plate 8—Col Dam, Upstream Face

much as 700 tons did not escape attention and where it was found that water accumulated in any crevice or depression on the surface of such boulders, small channels were cut in the rock to drain the water away. The result of these measures was most effective, and what had been a seriously infected and dangerous valley was transformed into a comparatively healthy and safe area in which the men could work and live with almost complete immunity from malaria.

When the anti-malarial works had been brought into effective operation, residential buildings, offices, workshops, shops, garages, a hospital, police station, laundry, clubs, and other necessary buildings were erected until one side of the valley was transformed into a village with a population of over 1,200 persons.

Every building was adequately supplied with water, and drain-

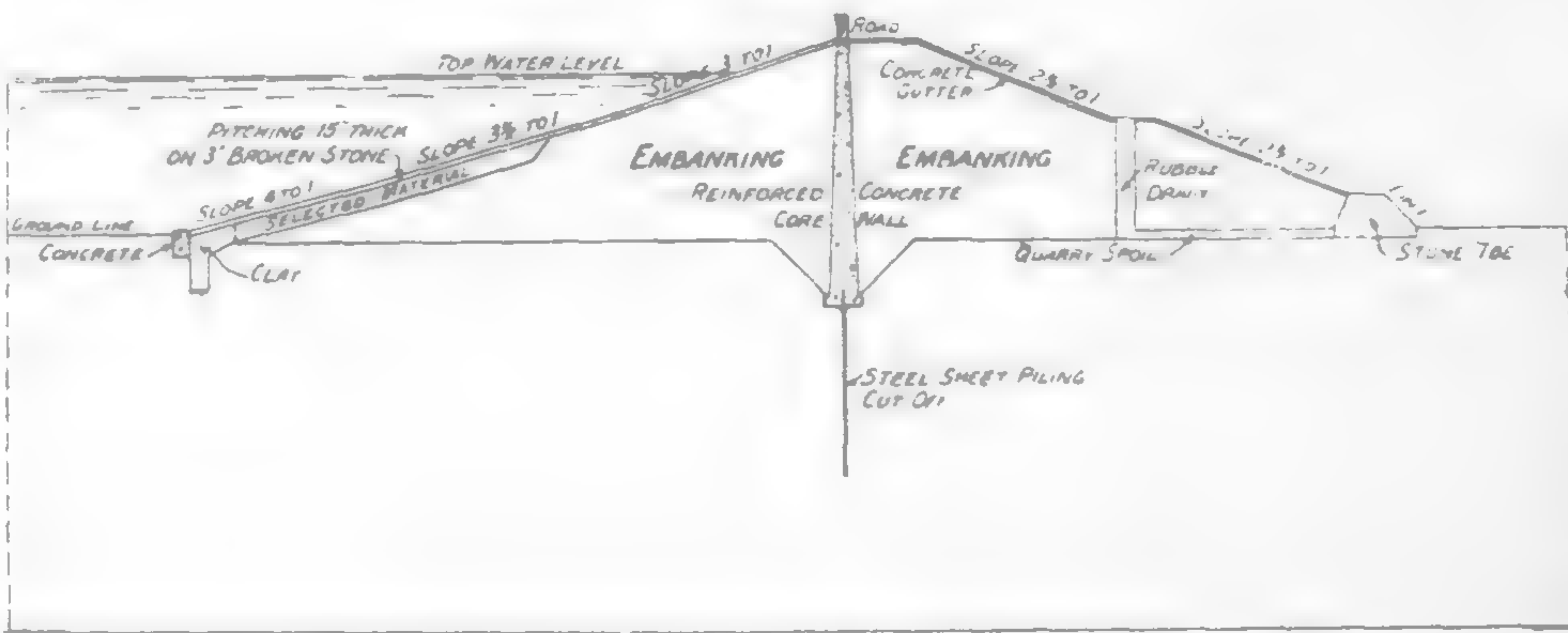
ed and sewered to discharge into septic tanks passing on to sprinkler filters, the filter effluent flowing into the main Gunong stream about a quarter of a mile below the dam site. All the buildings within the village were provided with electric light and every modern convenience was installed to add to the comfort and health of the inhabitants.

Before excavating the trench of the Pulai II Dam a timber flume was constructed with a concrete weir and wing walls above the site of the dam to carry the Pulai River over the trench to discharge at a safe distance below the downstream toe of the dam.

The excavation for the trench was then proceeded with, and 94,000 cubic yards of soft material and weathered and fissured granite had to be removed before a sound foundation was reached. Even then smaller fissures appeared, extending some considerable distance below the floor of the trench,

PONTIAN KECHIL. SUBSIDIARY EMBANKMENT.

SECTION 'B'.



SCALE OF FEET.



Plate 9—Pulai III Diversion Weir



Plate 10—Pipe Line, Mount Zion Crossing

and instead of removing further rock to a depth necessary to get below the fissures, cement grout was forced under pressure through holes drilled in the bottom of the trench until the fissures were completely sealed.

When the trench had been filled with Portland cement concrete in the proportions of five to one, work was begun on the dam, which was constructed of five to one Portland cement concrete with displacers, i.e. large sound pieces of rock embedded in the concrete in the body of the dam, so placed that no piece of rock came in contact with another, the spaces between them being filled with well rammed concrete.

The downstream and upstream sides of the dam are faced with random squared rock-faced rectangular granite blocks, cut by the "plug and feather" method from various large granite boulders. The stone for the concrete was obtained from six quarries in the vicinity of the dam, and after being crushed to the necessary dimensions, was conveyed to the concrete mixers near the site of the dam by winch operated inclined railways. Sand for the concrete was obtained from the bed of the Pulai River and required no crushing, being carried direct to the stages at the side of the concrete mixers. The whole of the masonry and concrete was lowered into position by an overhead aerial cableway except where, owing to curvature of the dam, the material to be placed was not within the range of the cable, when it was handled by cranes.

A valve tower with a circular shaft 15 feet in diameter was constructed on the upstream face of the dam, and draw-off pipes were fixed at various levels and connected to an upstand pipe in the tower which is connected to the main supply pipe passing through the tunnel in the dam and thence on to the filter house.

In order to dispose of flood water a spillway is provided towards the center of the dam, over which flood water discharges down the battered face of the dam into a specially constructed channel, ultimately to find its way into the original bed of the river.

The illustration at the beginning of this article presents a view of the

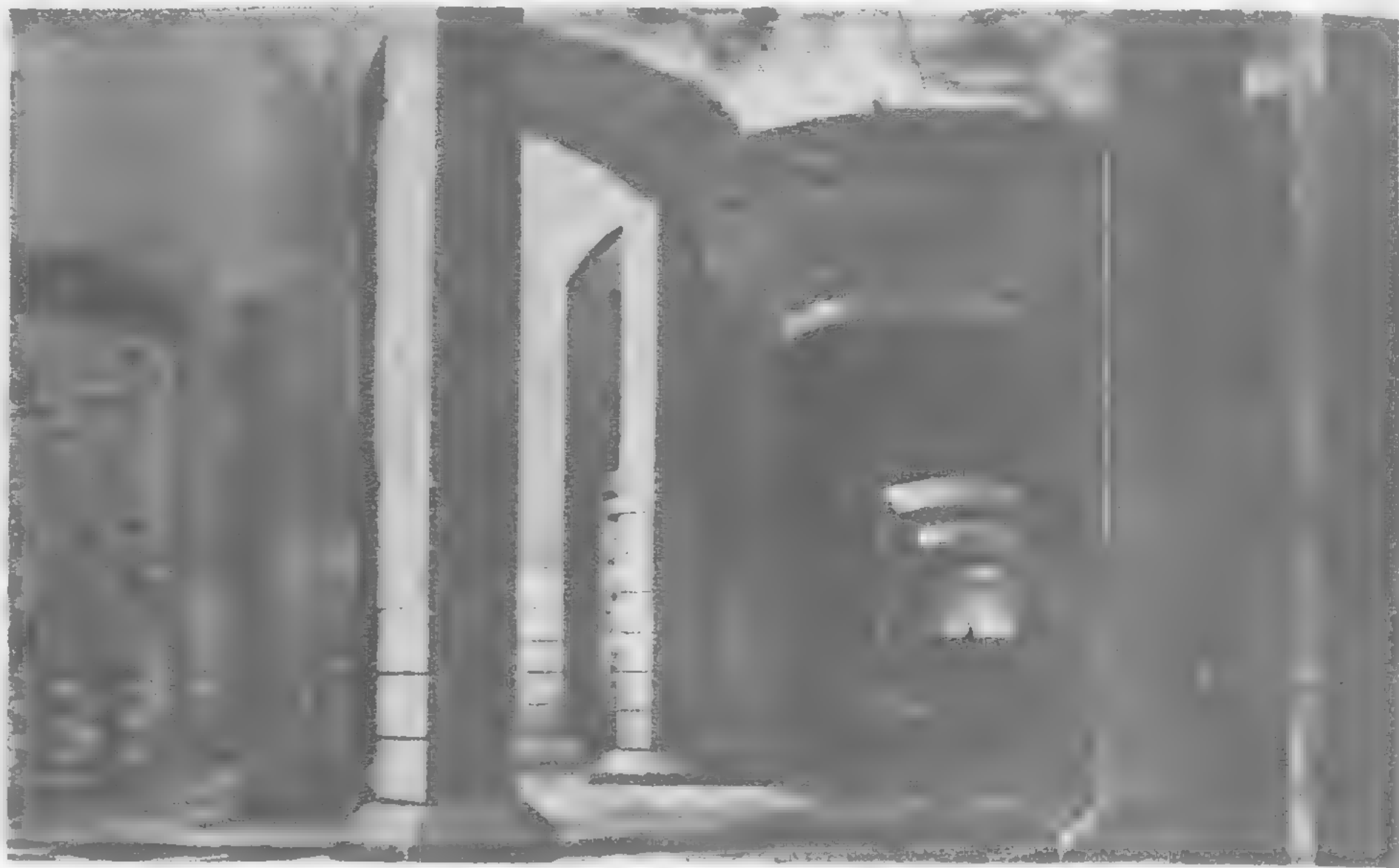


Plate 11—Fort Canning Reservoir, Interior



Plate 12—Fort Canning Reservoir, Interior

completed dam. This was taken from the south-west end at the top of the dam before completion of the work and at the time of the opening ceremony, it will be seen that water had at that time been impounded into the reservoir to about half its full depth.

After passing through the aerating tanks shown in Plate No. 7, and also through a battery of Paterson rapid gravity sand filters, the water passes into a clear water tank containing one million gallons and situated immediately below the filters. From the clear water tank it is conveyed to the Fort Canning Service Reservoir (shown on Plan No. 1) at Singapore through a pipeline, also shown on Plan No. 1, which is laid across the Causeway connecting the Island of Singapore to the mainland.

The Pulai II Dam is 126 feet high above the lowest part of the foundations and 600 feet long, curved in plan to a radius of 1,100 feet, and contains 59,000 cubic yards of concrete, and 9,000 square yards of masonry facing.

The reservoir has a top water area of 130 acres, a drainage area of 1,550



Plate 13—Fort Canning Reservoir, Completed Roof and Valve Houses



Plate 14—Pontian, South Dam Pile Driving Operations, Concrete Core Wall above Sheet Piling

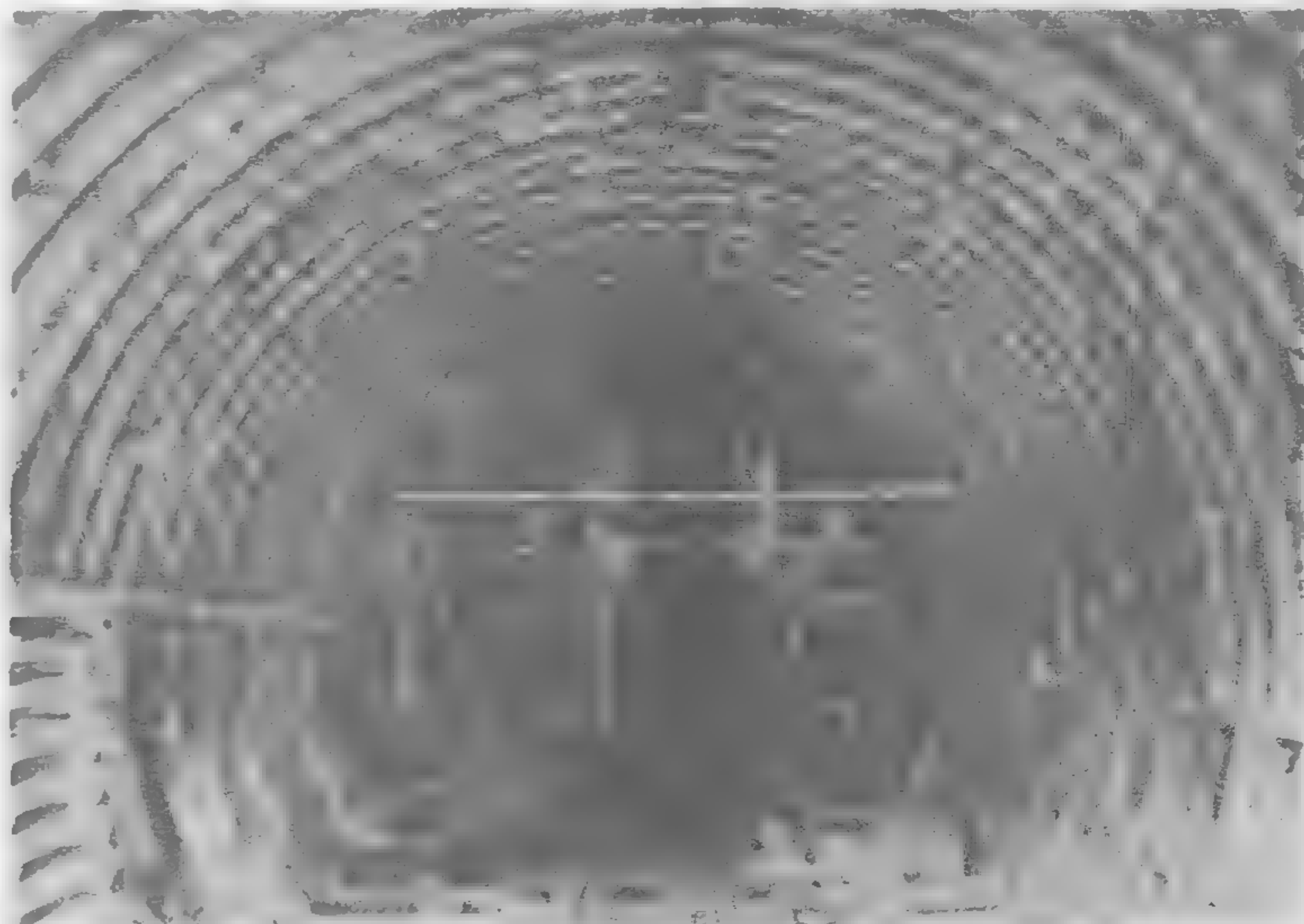


Plate 15—Pontian, Steel Tunnel Lining

acres, and contains 1,220 million gallons, and is capable of supplying Singapore by gravity with $6\frac{1}{2}$ million gallons of water a day.

The construction of the subsidiary dam across the depression or col on the west side of the reservoir necessitated the placing of 7,500 cubic yards of concrete in a wall built across the depression over a length of 340 feet and to a maximum height of 25 feet, being carried five feet below ground level. The nature of the material upon which the col was founded was disintegrated granite, and as no solid foundation could be found without excavating to a very considerable depth, and as it was known that water would otherwise percolate through the sloping side of the reservoir bank and underneath the foundations of the dam, a watertight reinforced concrete apron was constructed over the sloping ground, necessitating the use of 14,500 square yards of concrete seven inches thick, terminating at its lower end in a concrete toe.

Plate No. 8 shows the work at the col nearing completion.

The tunnel connecting Pulau II catchment area to Pulau III catchment area is 715 feet long, and four feet internal diameter, being



Downstream Side Dam Showing Strainer House and Bridge

lined through a portion of its length with concrete and in other portions with pressed steel segments according to the nature of the material passed through.

The diversion weir across the Pulau III (shown on Plate No. 9) is constructed of concrete and is 50 feet long with a maximum height of 14 feet above stream level and forms a small reservoir supplied from a drainage area of 430 acres, from which the water flows through the tunnel to the Pulau II Reservoir.

Pipeline.—Though the yield of the Gunong Pulau is $6\frac{1}{2}$ million gallons per diem, the pipeline from the dam to the service reservoir at Fort Canning is designed to carry 12 million

gallons per diem, the intention being that the pipeline will be large enough to convey not only the Gunong Pulau water, but also a portion of that from the second instalment to be described later.

The steel pipes were supplied by Messrs. Stewarts & Lloyds Ltd. of Glasgow, and in order to reduce the shipping charges the pipes were made in three sizes such that they could be shipped in nests, thus reducing freight charges very considerably.



Plate 16.—North Dam, Spillway



Plate 17—Pontian, Pumping Station with Space for Future Pumping Units

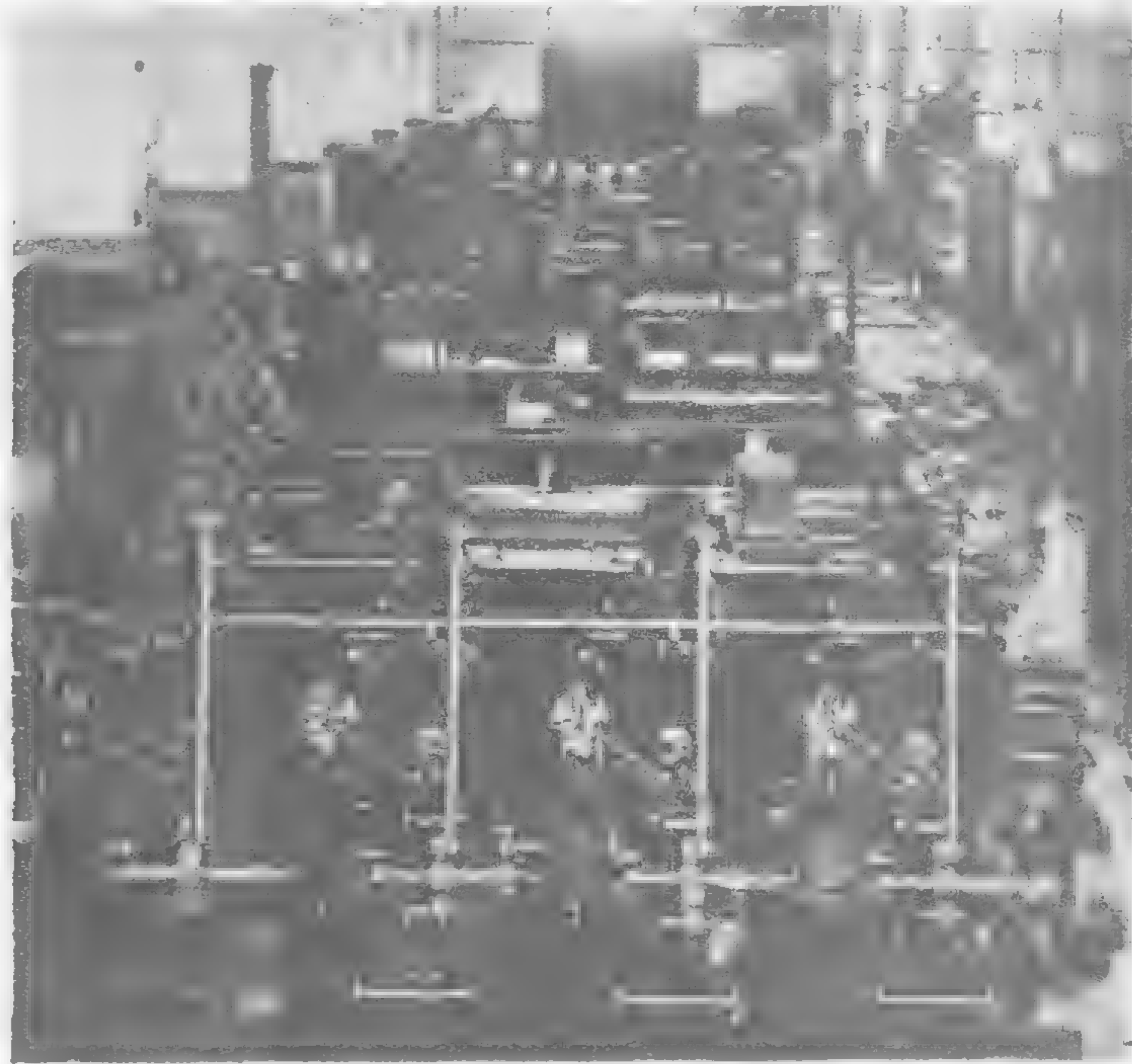


Plate 18—Pontian, Crossley Premier 340 h.p. Engines in Completed Pumping Station

On arrival at Singapore the pipes were conveyed to a depot where special machinery was designed and located and where the pipes were taken over by the Singapore Hume Pipe Company to perform the following operations.

The pipes were first placed in a machine which caused them to rotate at considerable speed. Whilst they were rotating cement mortar was placed in the pipes and by centrifugal action was forced against the side thereof adhering to the metal until a coating of cement mortar, half an inch thick, completely covered the whole interior of the steel face of the pipes, the object being to protect the metal from the action of water. When this mortar had set and the inner surface presented a perfectly smooth hard face, the pipes were transferred to another machine, where they were again rotated and spirally wrapped externally with tarred hessian to protect the exterior from the action of the soil. In the jungle where the soil proved to be acid, the pipes were



Plate 19—Pontian, Pumping Station and Valve House

protected from corrosion by a concrete surround. The pipes were then conveyed to the site of the pipeline and for the greater part were laid in trenches through hilly jungle and cultivated land, but where swampy ground was encountered they were laid above the surface thereof, being supported on concrete piers which, in turn, were in many places supported on Baku or reinforced concrete piles.

Where the pipeline had to cross a canal at Mount Zion (Plate No. 10) the pipes were constructed in the form of an

arch spanning 123 feet from bank to bank, the center being approximately 15 feet above the level of the canal.

The work of laying the pipeline across the Straits dividing the Island from the mainland was rendered a comparatively simple task as the Causeway had already been constructed, and the pipes were laid in the road thereof and through a subway under the lock.

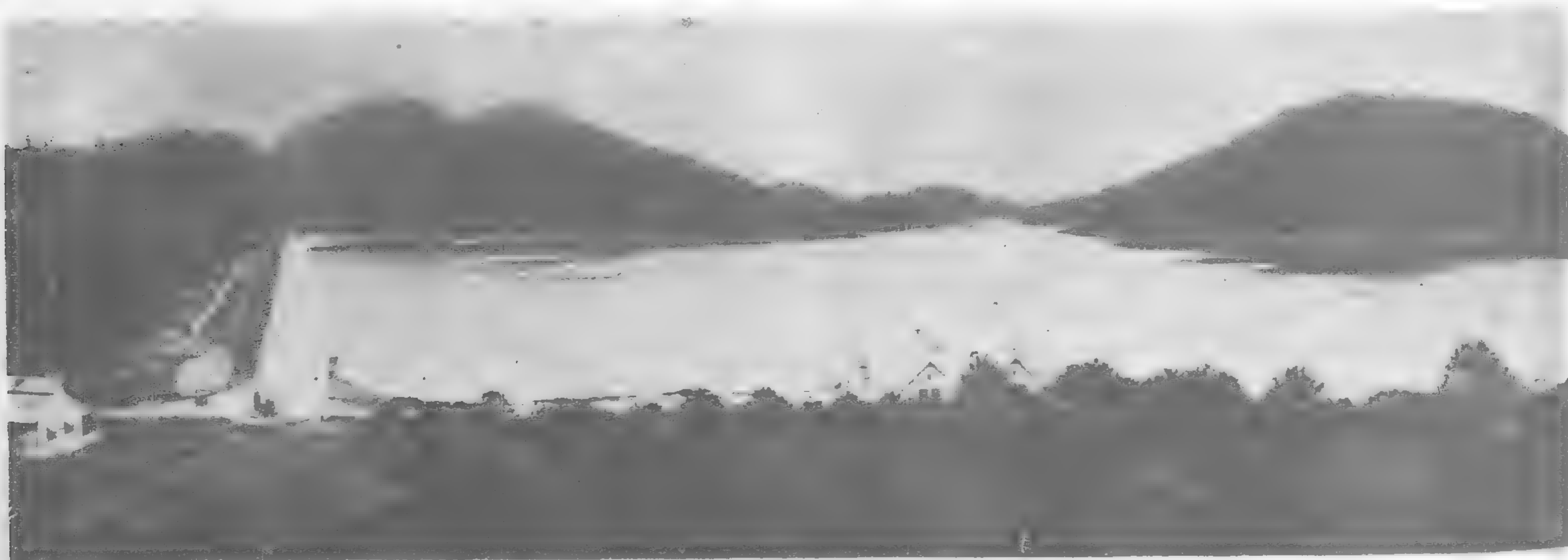


Plate 20—Pontian—Panorama of Reservoir Showing Roof of Pumping Station in Center and Reservoir almost Completely Filled

Fort Canning Reservoir.—This reservoir is situated on a hill immediately above Singapore on a site which was originally occupied by barracks. Before the work of construction could be put in hand new barracks were built and directly the old buildings had been removed, the work in connection with the reservoir was proceeded with.

The reservoir is constructed partially below and partially above ground, containing a total depth of water of 25 feet and storing 30 million gallons. The height of the reservoir from floor level to the top of the roof is 30 feet, being 10 feet below ground and 20 feet above. The floor consists of plain cement concrete covered with a layer of asphalt, whilst the walls are reinforced and faced with a layer of asphalt, being built in the form of a series of 64 horizontal arches each 30 feet long springing from 64 reinforced concrete buttresses. 462 columns each three feet thick built up of precast moulded concrete blocks carry a series of reinforced concrete groins spanning from column to column, which groins support the concrete roof of the reservoir built up of 264 concrete domes, hexagonal in plan, each dome having a span of 30 feet, being eight inches thick at the crown and 1-ft. 9-ins. thick where they abut on the concrete groins.

Where the reservoir wall stands above ground level it is supported externally by an earth embankment which is carried up to completely cover the concrete roof to a depth of 12 inches, the whole surface being sown with grass seed and presenting the appearance of a flat plateau covering an area of $4\frac{1}{2}$ acres.

Plates Nos. 11 and 12 show a portion of the interior of the reservoir in which the columns, groined arches, and a portion of two concrete domes can be seen, while Plate No. 13 shows an exterior view of a portion of the completed structure.

The Gunong Pulai Reservoir works were formally opened in March, 1929, by H.E. Sir Hugh Clifford.

Instalment No. 2

This instalment necessitated the formation of a reservoir within the Pontian Kechil Catchment area shown on Plan No. 2.

Before the permanent work was proceeded with, clearing of jungle and anti-malarial measures, as in the case of Instalment No. 1, had to be undertaken. Buildings were constructed in the Valley together with water and sewage works, and a road of access 8,400 feet long was made through dense jungle and over swampy ground to the site of the works.

To form the reservoir it was necessary to construct two earth embankments with core walls (Sections Nos. A and B). The main embankment is 65 feet high and 450 feet long, whilst the second or subsidiary embankment constructed across a depression at the southern end of the Valley, is 45 feet high and 2,900 feet long. Together they form a reservoir to contain 3,200 million gallons with a top water area of 550 acres and a drainage area of 3,000 acres, which will yield nine million gallons of water a day to Singapore.

In the case of the main embankment, the concrete cut-off wall was carried down into the solid rock which was reached at a depth of 45 feet below the bed of the river, the concrete filling being continued as a core wall within the center of the embankment to prevent water from passing through the permeable earth material of which the bank was constructed and in which there was placed 90,000 cubic yards of embanking material.

In the case of the subsidiary embankment (Section B) which contains 500,000 cubic yards of embanking material, the nature of the ground was such that a trench could not be sunk to the necessary depth in which to form a watertight concrete cut-off wall. Consequently a trench was sunk to a general depth of 15 feet, into the floor of which "Universal" steel interlocked piles were driven to a depth of 40 feet, with their tops projecting about four feet above the floor of the trench, 2,000 tons of such piling being used. Thus, below the bottom of the trench a watertight steel barrier was formed.

Plate No. 14 shows pile driving in operation.

On completion of the pile driving, the trench was filled with concrete, surrounding and burying the four feet projection of steel piles, and carried up as a core wall to above top water level. Thus,

the steel piles and concrete core wall formed a complete watertight barrier. The earth embankments were then constructed enclosing the concrete core wall.

The two embankments, as shown in Sections A and B, have slopes on the upstream side varying from $4\frac{1}{2}:1$ to $3:1$, and $2\frac{1}{2}:1$ on the downstream side, terminating at the latter side in dry stone toes, while in the case of the main embankment a dry stone toe is also provided at the foot of the upstream toe.

The water faces of both embankments are pitched with granite blocks weighing from four to five tons each—obtained from a quarry adjacent to the site of the reservoir—to protect the slopes from erosion due to wave action, and across the top of each embankment a roadway is formed, thus enabling access to be obtained from one side of the valley to the other. A roadway is also constructed round one side of the reservoir giving access from one bank to another.

As in the case of the Gunong Pulai, the river was conveyed across the site of the trench in a timber flume and continued to flow therein until the completion of the tunnel—Plate No. 15—which was driven through the hill around one end of the site of the embankment as a permanent portion of the work. This tunnel is 500 feet long and 13 feet in diameter, and is lined with pressed steel plates and concrete, the plates being supplied by Messrs. Braithwaite & Co. (Engineers) Ltd. of West Bromwich, England. On completion of the tunnel the flume was dispensed with and the water diverted to discharge through the tunnel and into the original stream at a safe distance beyond the downstream toe of the embankment.

In order to make provision for the discharge of flood water, a vertical concrete shaft was constructed from the tunnel, terminating above the surface of the ground in the form of a bellmouth 50 feet in diameter—Plate No. 16—and a spillway weir was also provided in the subsidiary embankment. Thus, when the water rises above a given level in the reservoir it flows over the lip of the bellmouth and down the shaft to discharge into the tunnel, the upstream end of which is blocked with concrete stopping to prevent water from the reservoir having direct access to the tunnel.

As the top water level of this reservoir is too low to afford a supply to Singapore by gravity, a pumping station was constructed near to the subsidiary embankment, which will house eventually eight Hathorn Davey pumps, three of which units have been installed, each capable of dealing with three million gallons a day of 24 hours and driven by Crossley Premier engines each of 360 h.p. See Plates Nos. 17, 18 and 19.

Plate No. 20 is a general view of the subsidiary embankment, showing the roof of the pumping station in the center of the picture, and the reservoir almost completely filled.

The water is pumped from this station through $3\frac{1}{2}$ miles of 30 inch diameter steel pipes to discharge into the aerating tanks, filters, and clear water tank provided under Instalment No. 1. Thus, the waters from the Gunong Pulai and Pontian Kechil Reservoirs meet at a common point, whence they are conveyed by gravity through the same pipe-line to Singapore.

The construction of the Pontian Kechil Reservoir was begun early in 1928 and finished at the end of 1931.

The total cost of the works described in this article amounted to Tls. 22,000,000, and it is estimated that the water requirement of Singapore will be met for the next twenty years, when Instalment No. 3 may be carried out, consisting of the diversion of streams to the N.W. of the Pontian Kechil Reservoir into which they will flow and be stored.

With the exception of the pipeline from Pulai to Singapore, which was carried out by contract, the works have been executed by direct administration during the Presidency of Mr. R. J. Farrer, C.M.G., M.C.S., until January, 1931, and of Mr. W. Bartley, M.B.E., M.C.S., from that time to completion.

The works have been carried out at a figure substantially below the original estimate and within the time originally anticipated.

Mr. H. L. Pearson, M.INST.C.E., acted as Chief Resident Engineer from 1924 to 1927, and Mr. G. B. G. Hull, O.B.E., M.INST.C.E., from 1927 till the completion of the works in 1932.



View of the Green Island Cement Company's Works taken from a Hill in the Rear. On the left is the end of the Coal Store, this Building being joined by a Gantry to the Kiln Building and the Cement Mill House seen on the right. Over the Cement Mill House are the Cement Silos. Over the Top of the Kiln Building can be seen the Top of the Raw Mill. The Stock of Limestone also can be seen beyond which is the Old Dry Process Works

Growth of Cement Industry in Hongkong

Entirely New Plant is Installed at Hok Un by the Green Island Company

THE Green Island Cement Company has manufactured Portland cement in Hongkong for more than three decades. From time to time their machinery has been brought up-to-date and last year a completely new wet process plant was installed.

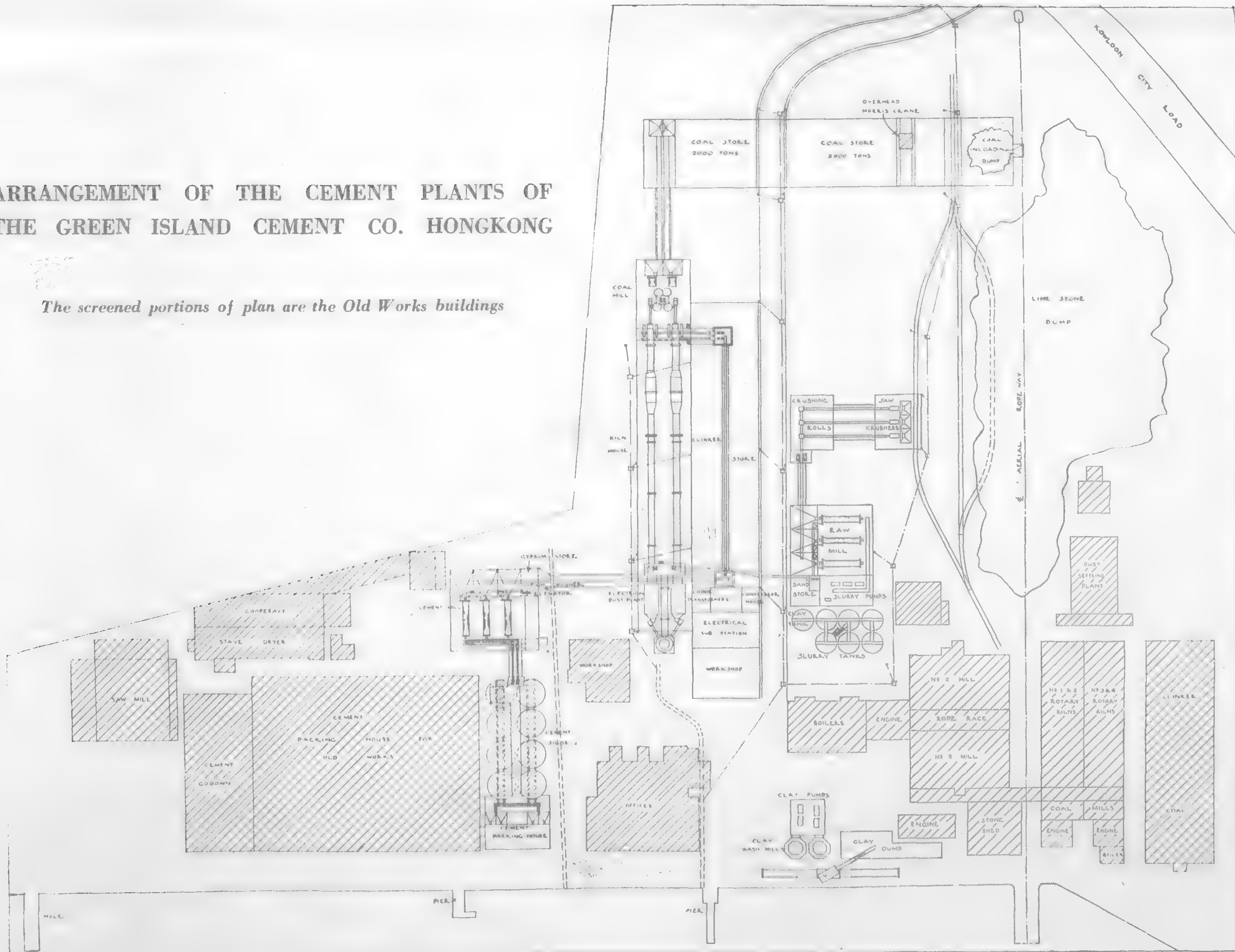
The demand for cement in Hongkong is considerable and at the moment of writing the Company is operating not only the new works but the old plant as well. The machinery for the new works is British throughout and was supplied by Messrs. Vickers-Armstrongs, Ltd. of Barrow-in-Furness as main Contractors.

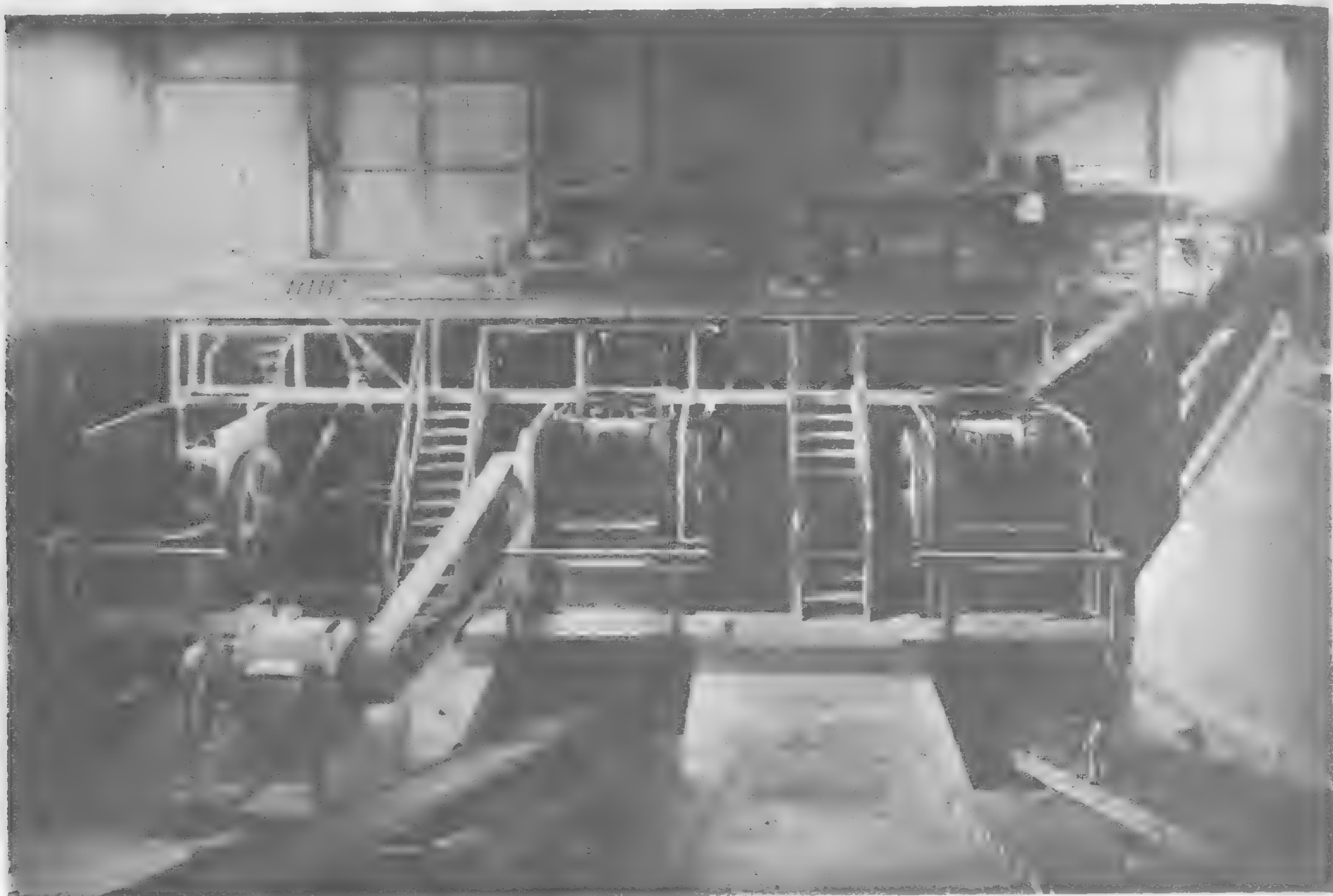


General view of the Green Island Cement Company's Factory from the sea. This shows, Left to Right, the old Cement Go-down the new Cement Silos, and Packing House, the Offices, Clay Washmills, the old Dry Process Works and the Pier where stone landed

ARRANGEMENT OF THE CEMENT PLANTS OF THE GREEN ISLAND CEMENT CO. HONGKONG

The screened portions of plan are the Old Works buildings





Showing Limestone Jaw Crushers. The Trucks in which the stone arrives are seen at the Top together with the Pneumatic Tipping Device. The Stone is tipped into the Hoppers from which it is fed by the Finger Feeders to the Crushers. Below the Crushers is seen the Belt which transports the stone to the Secondary Crushing Rolls

Briefly, the new plant comprises two 254 feet rotary kilns with their ancillary crushing, mixing and grinding machinery. The output of the new works is about 100,000 tons of ordinary Emerald Brand Portland cement per annum, together with between 10,000 and 15,000 tons of "Emeralcrete," the rapid hardening variety of cement which is produced by the Company. In addition to this the old plant is still in operation, producing about 50,000 tons of ordinary cement per annum.

The erection of the works constitutes what must be a record in overseas constructional work of this nature. From the time the first foundation was installed until the works started operation a period of only sixteen months elapsed.

The cement produced by the Green Island Cement Co. has always been of first class quality, more than complying with the

requirements of the British Standard Specification. Although a new Specification was issued in 1931 with much more rigid requirements, the cement produced complies with this Specification with ease.

Started in 1889

The Green Island Cement Company first started the manufacture of cement in 1889, and increased its capacity ten years later by the installation of kilns and machinery. In 1905 the earliest type of rotary kilns were installed at Hok Un, and, since that date, cement has been manufactured in these rotary kilns on the dry process.

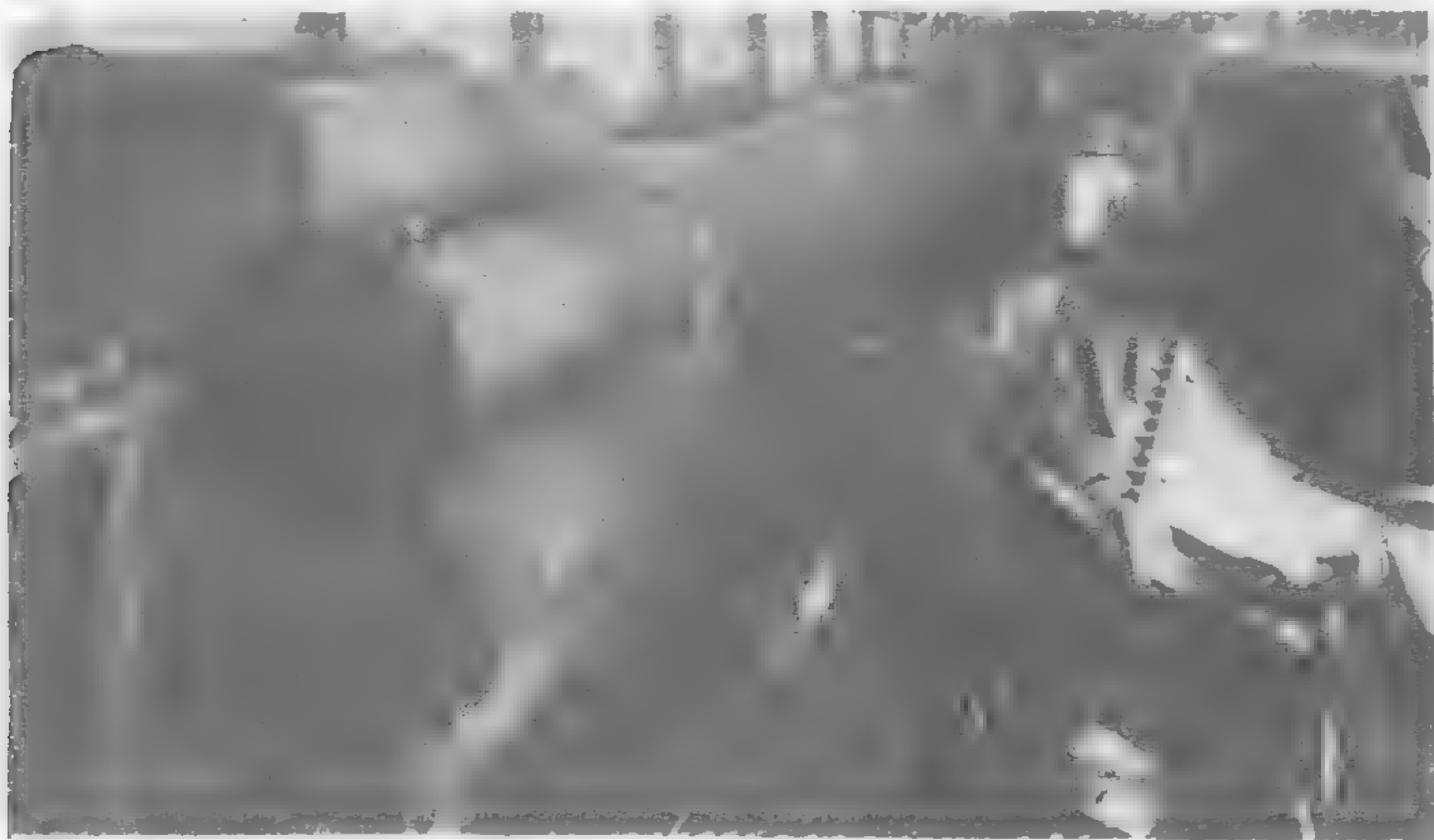
The chief raw materials for the manufacture of Portland cement are limestone and clay. Limestone is obtained from a



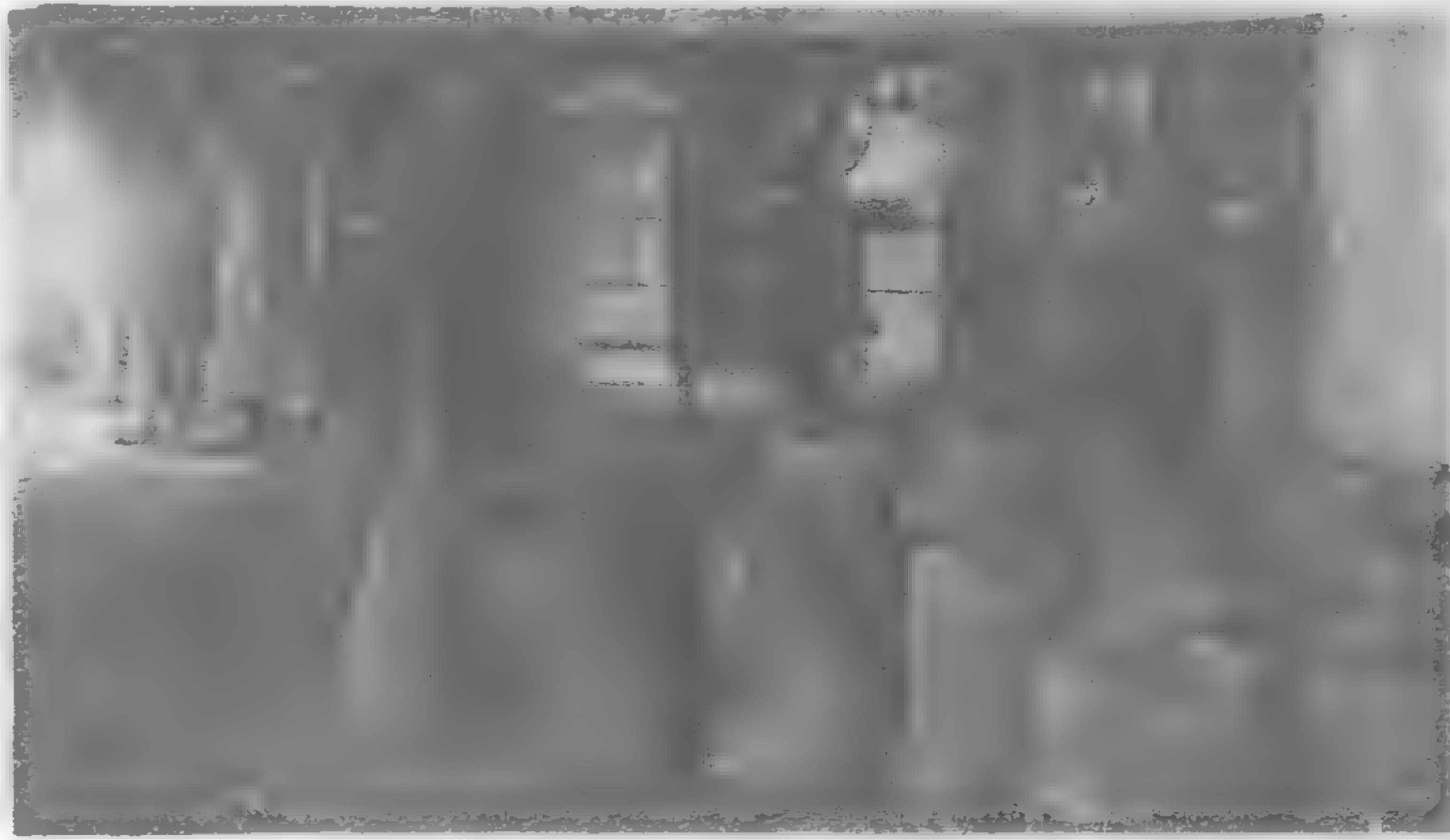
One of the Raw Mills for reducing the Limestone and Clay to Slurry. Above the Mill can be seen the Concrete Limestone Bunkers. On the Left is the Slurry Pump House



Two of the Three Motors which drive the Raw Mills. The Motor House is situated under the Limestone Bunkers



The two "Reflex" Type Rotary Kilns. These have an Overall Length of 2,548. The arrangement of the Cooling Cylinders can be seen at the Discharge End of the Kiln



Portion of Floor of Cement Backing House, Dial Weighing Machines can be seen. Two other pairs of Bag Packing Scales are arranged at other end of this Floor

number of sources and landed in junks at the works' wharf. Here it is transferred to an aerial ropeway, which, in turn, deposits the stone upon the storage ground.

The clay or mud used is dug locally and landed at the works in the Company's clay barges. A 2½ ton grab capacity limestone digger, working on a caterpillar track, loads the limestone from the storage piles into trucks, which are, in turn, hauled to the crushers. The limestone is crushed from pieces as large as two feet cube down to ¾ inch size and under by means of these crushers.

The crushed limestone and clay are fed together into what is known as a compound ball and tube mill, 40 feet long by six feet six inches in diameter. These mills are about half full of steel balls and revolve at the rate of 25 revolutions per minute. There are three of these grinding mills coupled to 375 h.p. motors.

Slurry

The resulting raw material comes out in the form of slurry, which should contain approximately 76½ per cent of calcium carbonate. The exact determination of the quantity of calcium carbonate in the slurry and its fine adjustment is carried out by the works' Chemist. When the slurry contains the proper proportion of materials, it is pumped to the feed end of two rotary kilns. These kilns are each 254 feet long and slowly revolve at a speed of about one revolution per minute. They are set on a slope, and, at the bottom end, powdered coal is blown in, which ignites in the firing zone. The hot gases travelling up the kiln, as they meet the down-coming slurry, drive off the water and carbon dioxide, and finally sinter the calcareous and argillaceous materials into cement clinker. The temperature at which this operation takes place is 2,700° fahr.

Making the Cement

All that now remains is the storage of this clinker and its grinding into cement. For this purpose a large clinker store is furnished, together with the necessary feeding and extracting conveyors, and the clinker is taken to the cement mill house. In this house are three 36 feet by six feet six inches diameter compound ball and tube mills, as before about half full of steel balls, and revolving at the rate of 23 revolutions per minute. Into these mills the clinker is fed, together with a small portion of gypsum. The gypsum is required to regulate the setting time of the cement, which, without its addition, would be too rapid to work. The

cement for ordinary purposes is ground in these mills to such a fineness that 95 per cent of the cement passes through a sieve having 32,400 holes to the square inch.

Finally the cement is stored in eight reinforced concrete silos about 95 feet high, which contains 2,000 tons of cement each. From the silos it is extracted by means of conveyors and transported to the bagging plant. Here automatic bag filling and barrel filling machinery is installed and cement is delivered from the packing house to the godown or direct for export.

The Dust Problem

Throughout the works the greatest care has been taken with the elimination of dust. Elaborate dust collecting plants are installed in the cement mill and packing plant, where, otherwise, a quantity of dust would be dissipated into the atmosphere. Ordinarily speaking, the gases from the kilns contain a percentage of dust. In order to prevent this reaching the atmosphere, an electrical dust precipitation plant has been installed, which deposits approximately 97 per cent of the dust which is contained in the gases. When it is realized that the total dust contained in these gases only amounts to approximately 5 per cent of the weight of raw material used, it will be observed that when the gases have passed through the precipitator, and 97 per cent of this 5 per cent has been deposited, very little dust escapes into the atmosphere.

British Machinery

The machinery installed in the new plant is entirely British, and is, in the main, manufactured by Vickers-Armstrongs, Ltd., of Barrow-in-Furness. Vickers-Armstrongs' representative responsible for the proper working of the machinery is Mr. W. G. A. Turner, ASSOC. M. INST. C.E., who has been present throughout the erection. The Consulting Engineer, who designed the plant and its arrangements on the site, is Mr. Henry Pooley Jun., B.SC., ASSOC. M. INST. C.E., A.M.I.MECH. E., M.I. STRUCT. E., F.G.S.

The cement manufactured by the Company is of the highest quality and equal to any cement produced in Great Britain or elsewhere. The cement is largely used locally and exported to the Straits Settlements and elsewhere. At the present time cement is being manufactured at Hok Un at the rate of something in the neighborhood of 160,000 tons per annum.



Approach to the Works taken from the Tunnel through the Coal Store. On the Left of the Concrete Road is the Crusher House, and on the Right the Clinder Store

Testing Materials in China

By Professor C. A. MIDDLETON SMITH, M.Sc., M.I.Mech.E.

Taikoo Professor of Engineering in the University of Hongkong. Past President of the Institution of Engineers and Shipbuilders, Hongkong. (Author of "A Handbook of Testing Materials," etc.)

It is essential that an engineer should possess accurate data concerning the strength of the materials which he is using in his work. In many cases the lives of hundreds, and perhaps even thousands of people depend upon the accuracy of that knowledge.

Some of us remember the appalling loss of life caused some years ago by the collapse of the Quebec bridge. The subsequent enquiry proved that the cause of the disaster was an error in calculation in the designer's office, but the result would have been the same in any similar structure if materials of inferior quality had been used.

The collapse of the roof at Charing Cross Railway Station, London, was also a case involving loss of life. A tie-bar had been welded. The roof fell in because the weld had been badly worked. All calculations had been made on the assumption that the material would withstand ordinary stresses. In actual fact it failed at a comparatively low load.

In Great Britain, the United States, and many other countries, engineers satisfy themselves that the materials which they use are suitably strong. They either make tests themselves on specimens of the material, or they require expert testers to do so. The careful engineer obtains a certificate, or some authentic record, of the results of the tests.

During the last eighteen years we have, in the University of Hongkong, undertaken this work for local engineers. We have made some thousands of tests on steel, cement, woods, ropes, alloys and other materials. We have obtained some good results and some that showed clearly that the material tested was not satisfactory.

"Send it out to China"

Some of us have come to the conclusion that materials of very indifferent quality have been, and now are being, sent out to China. That fact needs to be made known to engineers in this part of the world. Not only does the use of bad materials cause a great loss of money by producing failure, it may easily lead to loss of life. Any disaster will certainly injure the professional reputation of the engineer responsible for the work.

It would seem that when manufacturers find that engineers in the country of origin of the material refuse to accept the material, as a result of tests made to find its quality, then they say "Oh! send it out to China, nobody will test it out there."

That is not only unfair, it is very dangerous and every effort should be made to fight against this practice.

It therefore behoves all engineers in China to satisfy themselves that the materials used by them will pass certain standard tests.

Reinforced Concrete

In Great Britain, the Universities have well equipped laboratories suitable for such work. The engineering students are instructed in these laboratories so that they may realize the importance of such tests. They also learn, in a way that lectures and text-books cannot convey, the properties of the materials used by engineers in practice. In addition to teaching work, the laboratories are used to aid practical engineers. Commercial tests are made. Certificates are issued stating the results of tests on materials submitted. This system is common in other countries, and exists in Hongkong. The responsibility of the engineer in charge of the work is very much reduced if he obtains a certificate showing that the material used is satisfactory.

The most important aspect of this problem in China to-day is that which is connected with reinforced concrete construction. It concerns the two materials used for such design, viz. steel and cement.

Government Supervision

So far as engineering work is concerned there is very little manufacturing of machinery done in China. It is true that in Hongkong and Shanghai there is carried out a considerable amount of shipbuilding, ship repairing and marine engineering. But in China nearly all of the machinery in use has been imported.

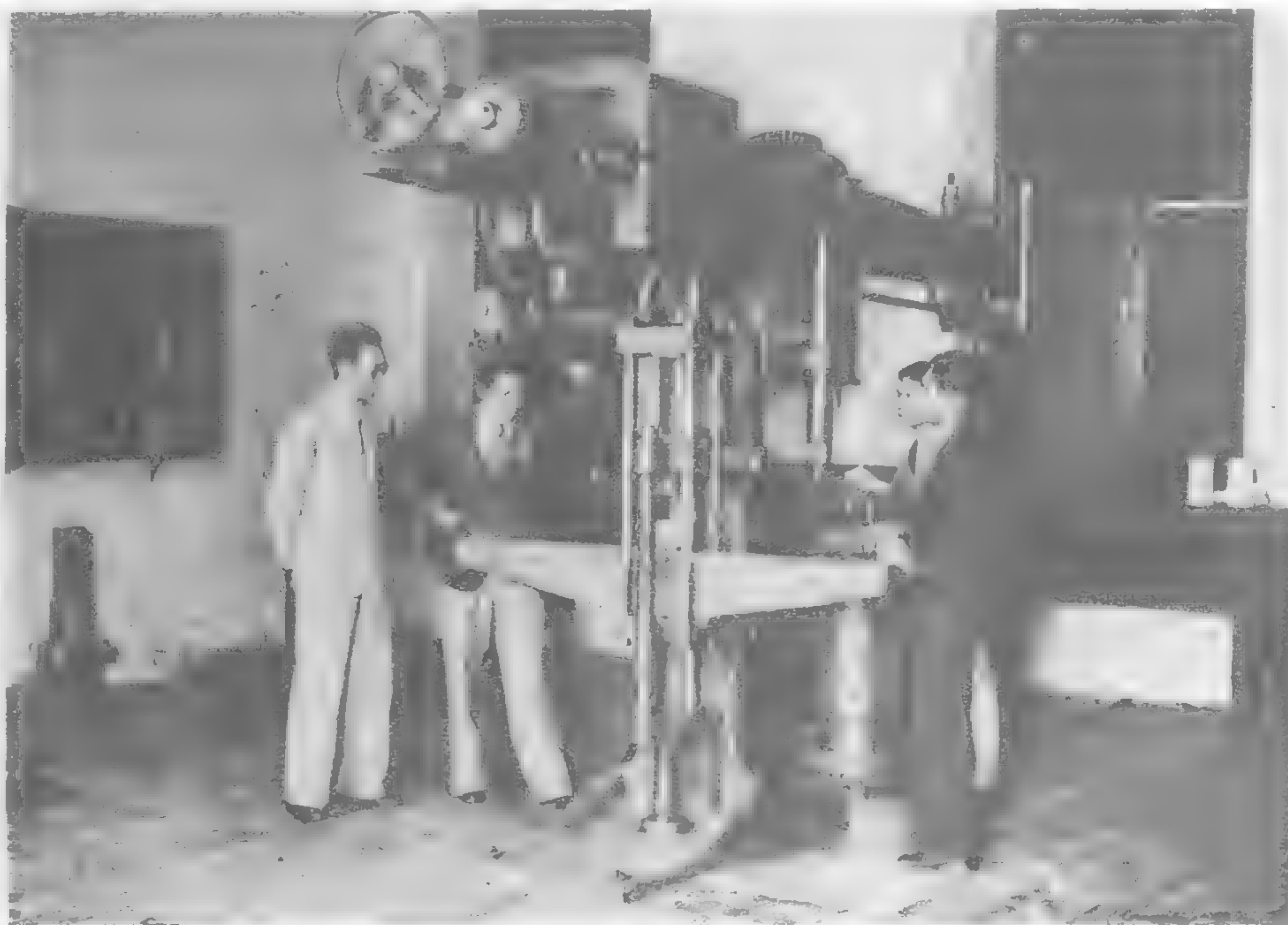
In Hongkong the local Government have a number of marine surveyors whose duty is to satisfy themselves that all materials used

in shipbuilding and repairing yards are up to the standard required by the British Board of Trade. It is, therefore, practically impossible for any inferior material to be used in shipbuilding yards in Hongkong. Probably similar precautions are taken in Shanghai.

There is often doubt about the quality of electrical wiring that is being used in China, but it is possible to have insulation tests, etc., made on the material. A well managed electric supply company will see to it that such tests are made. There is a belief that in the mania for cheapness (rather than quality) that exists in China to-day, indifferent material is being sold in places other than Hongkong and Shanghai in connection with electrical installations.

Material concerning which accurate data is seldom obtained is the wood used in building construction. Until a few years ago there were no records of tests made on Far Eastern timbers. A number of results have been published showing the figures obtained on a very complete series of tests made in the University of Hongkong on the woods in common use in the Far East.

One curious fact emerged from these investigations. It was found that one wood would have several names—Malay, Dyak, Dutch, etc.



University of Hongkong Engineering Students Working the 30 Ton Tensile, Compression and Bending Machine

On one occasion a local engineer praised with enthusiasm a certain wood from Singapore but said that a wood from Borneo was useless. It was the same wood under a different name.

Tests on Steel

Let us consider the requirements that an engineer may reasonably demand of steel and cement for buildings.

Nearly all of the steel that has been tested in the University of Hongkong has been material for reinforced concrete work.

The British standard specification says that such steel must have an ultimate tensile stress of at least 28 tons. In actual fact nearly all of the steel submitted during recent years has failed at about 24 tons per square inch. It would be rejected in England. Most of this steel is used in buildings but tests should be made on steel used in any type of construction.

Suppose a bridge is to be built. It may be of stone, steel, wood or concrete. If of steel it may include steel cables or rolled steel shapes. The design and appearance of the bridge will depend upon the material used. The first cost, the cost of maintenance, and the durability of the bridge will also depend upon the material used.



Cement Testing Machine, University of Hongkong

Having determined what materials are to be used in the construction of the bridge the engineer specifies that the materials must have certain physical and chemical qualities. The required strength, ductility, hardness, percentage of foreign elements such as phosphorous, sulphur, etc., is stated. It is a part of the contract that specimens of the materials used must pass certain definite tests.

In Great Britain very valuable work has been done by a body known as the British Engineering Standard's Committee; similar bodies in other countries have formulated standards. A number of engineers have given their services in the endeavor to procure economy and reliability in engineering work. As a result many standard specifications have been published. These are accepted as representing the desirable requirements. A number of the publications of the British Engineering Standard's Committee deal with the materials used in engineering work.

The Use of Cement in Early Days

In the days that were almost prehistoric the human race erected very considerable buildings. But the early civilization was in the East and in relatively dry places. So that cement was not essential.

Some unknown pioneer of engineering work discovered that when calcareous stones were burnt they differed from the original stone. They were softer and were easily ground. Most important of all, when mixed with water, the ground stone set.

The Romans saw the need of a material that would resist the weather conditions of the more westerly countries. What might bind building materials together in a dry climate, such as Egypt, or parts of North China, would not do in Europe where the atmosphere is more humid.

So the Romans made what is called "hydraulic" cement. Lime mortar was used, but a true hydraulic cement was prepared by adding a substance containing siliceous matter.

Smeaton's Experiments

A turning point in the science of cement manufacture was Smeaton's experiments in connection with the new Eddystone lighthouse. In 1756 he was commissioned to replace the earlier structure which had been burnt. His experiments showed that in his own corner of research



Working the 60 Ton Compression Testing Machine, University of Hongkong

Smeaton did work which was as permanent as his lighthouse is stable.

And then, in 1827, an English bricklayer named Aspdin hit upon the fact that a mixture of chalk and clay, when burned, produced hydraulic cement. And this was the origin of Portland cement.

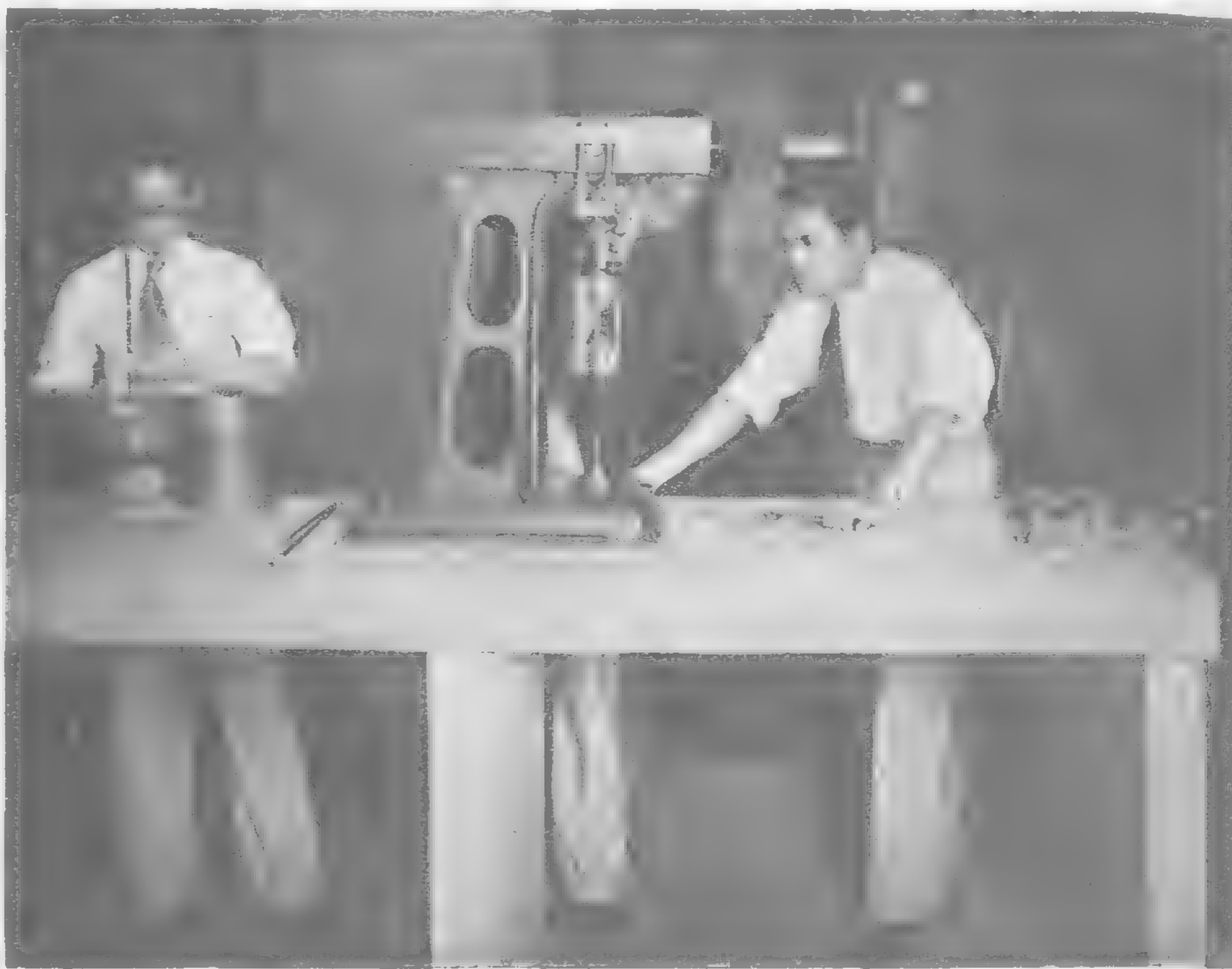
Portland cement, therefore, was contemporary with the first railway, and the first ocean steamship. It antedated by some thirty years our two most important structural steels—Bessemer and open-hearth.

And now, to-day, Portland cement can be manufactured in many parts of the world, for the raw materials are spread all over the earth's crust. But the demand for cement in China is, at present, trivial when compared with the demand in America and Europe.

Cement in Hongkong

In Hongkong there is a large plant for making cement. Green Island cement has been produced for many years. Recently the plant has been extended and the capacity of the works in Hongkong has been increased considerably. The equipment recently installed cost about £250,000.

Many years ago a cement works was equipped in Canton. It does not appear to have been very



An Experiment to Find Young's Modulus of Elasticity, Hongkong University



Testing Machine, University of Hongkong

successful. It has been recently re-equipped, with modern machinery. It will be of interest to see whether the cement produced satisfies the British Standard Specification.

In Japan cement manufacture is an important industry. Millions of tons of cement have been used in the Far East for building purposes only, while vast quantities have been employed in the construction of dams, reclamation works and other civilizing agencies. And the demand for cement in the Far East increases each year.

Canton, Sheki, Amoy and other towns in South China are being rebuilt with houses of reinforced concrete. The dwellings in the Far East in the treaty ports of China and in Japan are being transformed in appearance because of the popularity of the new style of construction.

To give some idea of the rapid increase in demand for cementing materials during this century the following figures may be quoted.

In the United States of America the tonnage of cementing materials produced in 1903 was 7,254,823. In 1913 the figure had grown to 21,136,630.

It would be of great interest if we could obtain detailed figures for the Far East.

The Trend of Prices

A former Major Engineer, U.S.A., named Edwin C. Eckel, C.E., who is a recognized authority on the subject, has expressed the opinion that in the U.S.A. average prices will fall. He thinks that the price level in 1950 will be substantially that of 1900. Cementing materials demand a heavy fuel consumption in the process of manufacture and the price of cement in China will depend upon the development of the fuel resources of the country.

Incidentally it should be mentioned that in China it is not only inevitable but desirable that labor costs will increase. For increased wages means an increase in purchasing power and that means better trade. If there is, as we may expect, an increase in wages, then the expense of building modern structures is unlikely to decrease in future.

But it is certain that there will be developed in China cement plants. And the reduced cost of production of cement may, to some extent, compensate for the increased cost of labor in building contracts.

Testing Cement

Let us consider the specifications dealing with cement. This material is of immense importance in modern engineering work.

For many years, in the University of Hongkong, we have carried out commercial and academic tests on all types of engineering materials. Cement testing is not quite so easy as many people think.

There are a large number of different brands of cement on the market. It is not surprising that those whose business it is to sell the cement make out a very good case in favor of the particular brand which they are marketing. In Hongkong you can buy cement that is made locally, cement from Japan, cement from Indo-China, cement from Europe and cement from other parts of the world. The prices vary considerably.

How then shall we determine the quality of the cement? It is, in Hongkong, usually specified that the materials must satisfy the requirements of the British Standard Specification for Portland cement.

This has been subjected to periodical review. The latest British standard specification for cement was issued in 1931.

Stresses on Cement

Before we consider the tests necessary to determine the value of a certain brand of cement we may consider the sort of stresses that it must withstand.

In ordinary uses, in heavy masonry, for example, the cement will be subjected to compressive stresses, but rarely to tensile stresses.

When used as a paving material it will encounter transverse stresses. And there will be severe abrasion.

Used in gun emplacements it will be subjected to severe and often repeated shocks.

Works exposed to sea-water are subject to chemical attack and that must be guarded against.

The Usual Tests

The (1931) British Standard Specification demands the following tests on cement:—

- | | |
|--|------------------|
| (a) Fineness | (d) Setting Time |
| (b) Chemical Composition | (e) Soundness |
| (c) Tensile Strength (cement and sand) | |

It will therefore be seen that in order to pass the British Standard Specification the cement must be subjected to five separate distinct types of test.

Incidentally it may be pointed out that this latest specification omits, altogether, the tensile test on neat cement. For many years this was the test relied upon by architects and engineers. It is therefore important to remember that it has been "scrapped" by the highest authority in England. It is obviously considered unsatisfactory.

In a "Foreword" to this revised specification it is stated that the question of including compression tests on cement and sand mortar, either in addition to, or substitution for the tensile tests has been considered by the British Engineering Standards Association.

The Technical Committee on Cement, however, thought it desirable to enquire further whether testing cement in compression in the form of three to one mortar is the most satisfactory alternative for the present test. An investigation on this point is being carried out in England. Meanwhile the tensile test on cement and sand mortar is retained.

Rapid Hardening Cement

In recent years new cements have appeared on the market. These are sometimes called "Accelerated Portland" or "Rapid Hardening" or "High Early Strength" Portland cement.

These cements usually give in two or three days the same mortar strength as do the normal or standard Portlands in 28 days.

During the Great War much front line work, on both sides, was done with these new cements. Since 1918 their use has spread on economic as distinct from military grounds.

But the Technical Committee alluded to above is of the opinion that further research work must be done before it can be

stated definitely what are the requisite standard tests for these new cements. Investigations are now being made in England.

Tensile Tests

The only tensile tests now demanded are those on three to one sand cement mortar at three days. The average result of this test should be 300 lb. per square inch. The strength at seven days should show an increase over three days and be not less than 375 lb.

It should be mentioned that there is a certain standard sand named "Leighton Buzzard" sand, which should be used for these tests. We have this sand sent out to the University periodically from England.

Experience has taught us that the local sand is unsatisfactory for standard tests.

It is not fair to the cement makers to use any kind of local sand for these standard tests on cement.

Standard Sand

The sand adopted for the American standards is "natural sand from Ottawa, Illinois, screened to pass a No. 20 sieve and retained on a No. 30 sieve. This sand having passed the No. 20 sieve shall be considered standard when not more than five grains pass the No. 30 sieve after one minute continuous sieving of a 500 grain sample."

It may be mentioned, in passing, that although it may be convenient to describe the sand from the Ottawa locality as "natural sand" it is not entirely an exact description. The sand there quarried is the residuum from the decay of a loosely cemented lime-stone.

The U.S.A. Government specification 1917 (revised up to 1928) demanded that the average tensile strength in pounds per square inch of not less than three standard mortar briquettes composed of one part cement and three parts standard sand shall be equal to, or higher than, 200 lb. per square inch at seven days and 300 lb. per square inch at 28 days.

This may have since been revised.

In 1905 the British standard for cement sand mortar was 120 lb. per square inch at seven days and 225 lb. per square inch at 28 days. It is now 300 lb. per square inch at three days and 375 lb. per square inch at seven days.

These figures show how great has been the improvement in the quality of the cement during the last 26 years.

The standard figure for cement-sand mortar strength at seven days has gone up from 120 lb. per square inch to 375 lb. per square inch.

Various Standards

It would seem that the time has come when there might almost be an international standard for the strength and testing of cement.

In the meantime, since China has no standard at all, purchasers would be well advised to insist upon either the British or the American standards.

The American standard specification is more detailed than that of the British Standards Committee.

In the University of Hongkong we use the American methods, as detailed in the specification, wherever there is vagueness in the British Standards Specification.

For many years architects and engineers satisfied themselves by making one test on cement only. In offices you will find an ordinary tensile testing machine for cement. It is comparatively small and not expensive.

In such offices it has been used, and in many places still is used, solely for making tensile tests on neat cement.

The standard specification, however, requires that tests should be made on cement-sand mortar.

We consider that, of all the tests specified, the most important is that made on the mortar.

The Personal Factor

It is not proposed to discuss the details of the cement-mortar test at length. It can be said, however, that the tests themselves are most important, but the results obtained by different people, making tests with the same brand of cement often differ.

The variations are due to (1) the type of sand used (2) the quantity—percentage by weight—of water used (3) the personal factor, i.e., the experience and knowledge of the individual making the tests.

(Continued on page 237)

A Record of Progress

Asia Realty Company's Report for 1931 is Enlightening

As a concrete example of progress being recorded in Shanghai in the face of every adverse influence the annual report of the Asia Realty Company reviewing the activities of this institution through 1931 is enlightening. Through a year of depression that has afflicted the entire civilized world, in which foreign exchanges have fluctuated in a manner wholly abnormal, and with wholesale and retail trade hampered and restricted by artificial conditions to a most unusual degree, the port of Shanghai, as disclosed in this report of the Asia Realty Company, has displayed an amazing commercial vitality.

Due to disturbed conditions in many parts of China a heavy influx of money was attracted to Shanghai through the year and this in the form of bank deposits made possible the financing of a turnover of real estate as great as in any year of the port's history. In this connection the company's report reads:

"The total figure of reported transactions for 1931 was Tls. 131,100,000 which amount in our opinion is only seventy per cent of the actual transactions consummated during the period under review." Likewise, capital available made it possible for the city to carry through a development and redevelopment program amounting in value to approximately Tls. 62,000,000 exclusive of municipal construction in the three political areas."

Reviewing measures of reorganization and expansion of business involving creation of new units the Company's report continues:

"The first of these is the Company incorporated under the Hongkong ordinances, now known as International Lands, Limited. This Company, up to the 1st of July, 1931, was our Trading Department. On that date the entire staff of the department was placed at the disposal of The Land Investment, Brokerage & Mortgage Company, under an equal joint agency agreement between the Shanghai Land Investment Company, Limited, and ourselves. Within a short time it was found expedient to incorporate this working unit under the Hongkong ordinances, with a charter sufficiently broad to enable it to conduct real estate brokerage and mortgage transactions, not only for its parent Companies but for the public as well.

"Somewhat later in the year, our Advertising Department was so widened in its scope that it was able to offer its services to our affiliated Companies. In this work certain of these Companies took partnership holdings, and this new partnership is now working under the name of Associated Advertisers, with offices at 101 Nanking Road.

"Another major feature of our activities has been the development of our own properties and redevelopment as well as new development for clients. The total payments in development for ourselves amounted during the year to Tls. 488,962.74 and for clients to Tls. 381,905.60.

"Concentration on development and purchases of developed property enabled us to make great strides in our policy of holding more developed estates. The following percentages show to what an extent this policy has been consummated.

Developed properties	..	Tls. 10,578,661.31	71.08%
Undeveloped properties	..	Tls. 2,871,584.22	19.29%
Properties under construction	..	Tls. 1,432,615.69	9.63%

"Trading in real estate, as has been mentioned, generally speaking, has been steady at a high level up to the latter part of the year. During the year the Company participated in this to the extent of a total of Tls. 12,397,429.23. The International Lands handled Tls. 5,573,128.63 of this amount. Of the total of Tls. 12,397,429.23, Tls. 10,627,138.56 was handled for clients. The difference between the value of the estates sold and the new estates purchased represents to a considerable extent, naturally, the growth of assets from 1930 to 1931, as reflected by the balance sheet. The transactions which brought about the total turnover are as follows:

"The Company during the first half of the year and in the last half, its agents, the International Lands, Limited, initiated 107 land transactions, have worked on 121 and have closed 107. Eight transactions have been brought forward into the year 1932. These figures include all transactions, except estate purchases which numbered 70.

"The following figures, taken from the balance sheet, reflect the growth of the Company:

Property held December 31, 1930	..	..	Tls. 9,713,974.07
Property held December 31, 1931	..	..	.. 14,882,861.22
Gross Assets December 31, 1930	..	..	.. 11,047,596.93
Gross Assets December 31, 1931	..	..	.. 16,405,454.26

"The increase in property held is 65.27%, while the increase in gross assets amounts to 67.34% in accordance with the above figures.

"The growth of our gross rental returns is shown by the following comparison:

The total gross amount of rentals received	
for the entire year 1929 was	.. .. Tls. 49,365.47
for 1930 was	.. .. .. 230,690.59
for 1931 was	.. .. .. 631,153.82

"The additional financing during the year required for the growth shown has come through the issue of Preferred Shares, 6%, to the extent of Tls. 1,195,344.00; 6% First Mortgage Debentures to the extent of Tls. 406,800.00; direct First Mortgages on real estate holdings were increased by Tls. 1,342,443.62; Loan Certificates issued to the extent of Tls. 707,444.01; and from diverse other sources, including profits on the sale of estates and rental income. We have, during the year, recalled all 7% bonds amounting to Tls. 31,400.00.

"It is obvious that with the expansion which occurred during the year 1930 and the continued growth during 1931, the staff of the Company was necessarily considerably increased. On December 31, 1930, our staff numbered 143; on June 30 it numbered 218; and on December 31, 1931, the staff had been reduced to 187. During this time we transferred 52 members of our staff to the International Lands, Limited and the Associated Advertisers.

"Your attention is drawn to the year's accounts, in which we find that the gross income from all sources is Tls. 1,859,359.91 as against Tls. 790,986.73 for 1930. The total of all expenses amounted to Tls. 1,118,193.72 as against Tls. 511,792.97 for 1930, leaving a total net income for the year 1931 of Tls. 741,166.19 against Tls. 279,193.76 for 1930. The net profits for the year 1931, Tls. 741,166.19 together with the credit balance brought forward from 1930, namely, Tls. 163,707.55, making a total of Tls. 904,873.74 have been disposed of by your Board of Directors as follows:

	Tls.
January 22, 1931—3% final dividend was paid in cash	.. .. 54,181.87
June 30, 1931—5% interim Stock dividend was paid	.. .. 90,360.00
June 30, 1931—6% semi-annual dividend was paid on Preferred "B" Shares Tls. 16,212.96 less accrued interest received Tls. 9,428.33	.. .. 6,784.63
December 31, 1931—6% semi-annual dividend was paid on Preferred "B" Shares Tls. 35,845.03 less accrued interest received Tls. 74.10	.. .. 35,770.93
December 31, 1931—6% annual dividend was paid on Preferred "A" Shares	.. .. 57,000.00
	Tls. 244,697.43

"Leaving a balance of Tls. 660,176.31 brought forward into the new year."

BALANCE SHEET AS AT 31st DECEMBER, 1931

ASSETS

Properties:	Tls.	Tls.
Freehold Land and Buildings	.. .. 14,937,100.99	
Leasehold	.. .. 1,752.34	
	14,938,853.33	
Less: Depreciation on Buildings	.. .. 55,992.11	14,882,861.22
Furniture, Fixtures, Equipment and Stores	.. .. 162,509.85	
Less: Depreciation	.. .. 28,374.86	134,134.99
Motor-cars, Trucks and Bicycles	.. .. 32,028.57	
Less: Depreciation	.. .. 13,701.29	18,327.28
Mortgages Receivable	.. ..	218,946.40
Sundry Loans	.. ..	295,203.29

Sundry Debtors and Debit Balances :

	Tls.	Tls.
On Open Accounts	205,580.47	
Sundry Amounts Accrued Due	2,193.80	
Deferred Charges and Payments in Advance	7,995.20	
	215,769.47	
	Tls.	
Less : Bad and Doubtful Debts Reserve ..	6,663.36	
		209,106.11
Share and Debenture Expenses, Commission and Discount	104,978.36	
Less : Written Off	10,478.36	
		94,500.00
Investments		81,922.95
Cash at Banks and on Hand		470,452.02
		16,405,454.26

LIABILITIES

Capital—		
Authorized :	\$	Tls.
Common Stock "A" 20,000 Shares of \$100 each	2,000,000.00	
Common Stock "B" 150,000 Shares of \$20 each	3,000,000.00	
8% Preferred Stock "A" 10,000 Shares of \$100 each	1,000,000.00	
6% Preferred Stock "B" 50,000 Shares of \$100 each	5,000,000.00	
	11,000,000.00	
Issued and Paid-up :	Tls.	
Common Stock "A" 15,904 Shares of \$100 each fully paid = \$1,590,400 at 72 ..	1,145,088.00	
Common Stock "B" 53,811 Shares of \$20 each fully paid = \$1,076,220 at 72 ..	774,878.40	
8% Preferred Stock "A" 10,000 Shares of \$100 each fully paid = \$1,000,000 at 72	720,000.00	
6% Preferred Stock "B" 16,602 Shares of \$100 each fully paid = \$1,660,200 at 72	1,195,344.00	
	3,835,310.40	
8% Mortgage Bonds	70,500.00	
Less : Redeemed	70,500.00	
6% First Mortgage Debentures :		
1st Issue	2,000,000.00	
2nd Issue	1,532,800.00	
	3,532,800.00	
Loans and Mortgages Payable	4,423,129.54	
Loan Certificates	2,593,715.62	
Sundry Creditors and Credit Balances :		
On Open Accounts	55,093.88	
Interest Accrued Due	203,717.60	
Sundry Amounts Accrued Due	49,317.84	
Construction, Repair, Improvement and Land Transaction Contingencies ..	14,583.20	
	322,712.52	
Reserves :		
Real Estate Fluctuation	589,793.59	
Building Depreciation and Renewal ..	235,000.00	
General	207,684.45	
Shanghai Dollar Exchange Fluctuation ..	5,131.83	
	1,037,609.87	
Profit and Loss Account :		
Balance as at 31st December, 1930 ..	163,707.55	
Less : Final Dividend on Common Stocks	54,181.87	
	109,525.68	
Add : Profit for year to date	741,166.19	
	850,691.87	
Less : Interim Stock Dividend		
on Common Stock	90,360.00	
Dividend on Preferred Stocks		
"A" and "B" 109,673.28		
Less : Cash Received on Account of Accrued Dividend on Shares	9,517.72	
	100,155.56	
	190,515.56	
		660,176.31
		16,405,454.26

COMPARATIVE STATEMENT FOR THE YEARS 1930 and 1931

	1930 Tls.	1931 Tls.
RESOURCES		
Real Estate	9,713,974.07	14,882,861.22*
Loans	423,273.15	514,149.69
Cash in Banks	726,616.77	470,452.02
Sundry Debtors, Investments, Furniture and Cars	183,732.94	537,991.33
	11,047,596.93	16,405,454.26
* Net after depreciation of buildings by Tls. 55,992.11.		
LIABILITIES		
Capital Paid-up	2,526,062.40	3,835,310.40
Loans and Debentures	7,010,357.53	10,549,645.16
Sundry Creditors	272,398.06	322,712.52
Reserves and Undivided Profits	1,238,778.94	1,697,786.18
	11,047,596.93	16,405,454.26

Testing Materials in China

(Continued from page 235).

For the above reasons it is obviously more satisfactory to have the cement tested in a laboratory where standard sand is used, where cement is being frequently tested, and where those who carry out the tests are unbiased, being neither vendors nor purchasers.

Tools and the Man

The profession of engineering is as ancient as any of the occupations of man. It is obvious that one of the earliest stages of civilization was the erection of some sort of shelter. Even before the first principles of a legal code were formulated, and perhaps even before anything was known or imagined concerning the art of healing, use was made of some of the laws of nature for purposes of offence and defence and for making weapons, tools and implements. "Man is a Tool using Animal. Nowhere do you find him without Tools; without Tools he is nothing; with Tools he is all."*

There is the Lake Dwellers' village of Wangen in Switzerland, built in the Lake Stone age, not less than 5,000, and possibly 12,000 years ago. To support the dwellings some 50,000 piles are said to be driven in the bed of the lake. Curiously enough you may see dwellings like that, to-day, on the island of Lan Tau near Hong-kong. It would be seen that the Chinese in a very primitive state used the same style of house and that the idea has survived on Lan Tau.

Nearly 5,000 years ago the pyramids were built in Egypt. Buckle, quoting from Diodorus, says that "to build one of the pyramids required the labor of 360,000 men for 20 years."

Recently, Mr. Kenry Stott, in a Presidential address to one of the leading Engineering Institutions in America, gave the following definition which explains why these early efforts are entitled to be called engineering works. He said that "Engineering is the art of organizing and directing men, and of controlling the force and materials of nature for the benefit of the human race." James Nasmyth, a great English engineer and inventor, defined engineering as "common sense applied to the use of materials."

In both of these definitions we find that the word "materials" is used. No work in engineering construction is carried out except by the use of materials such as steel, wood, stone, brick, cement, paint, etc.

These materials vary greatly in kind and in quality. Some may be suitable for one piece of engineering construction and unsuitable for another kind of work.

Enough has been written, it is hoped, to convince the reader of the necessity for obtaining records of the results obtained by testing materials of construction.

It is more particularly essential that such tests should be made in China because of the temptation of vendors of materials to supply stuff of poor quality. For experience has convinced the writer that the saying "Send it out to China—they won't worry about the quality out there" is not infrequently acted upon. And no one should be foolish enough "to buy a pig in a poke" as the old saying puts it. Make sure that you get good materials even if it takes a little extra trouble to make sure that they are good.

* Thomas Carlyle, *Sartor Resartus*.



Fig. 1.—Customs Launch "Arayat" towing Cutter-Head Suction Dredge as the vessels appears on arrival at Manila from Germany

Two New German Vessels are Built for the Philippines

Customs Launch "Arayat" Tows Cutter-head Suction Dredge from Elbing to Manila

By ROBERT DLUHY, Chief Engineer

AT the beginning of February, this year, two remarkable new vessels, the product of the shipyards of the F. Schichau G.m.b.H., Elbing, reached Manila, the port of their destination, in the Philippine Islands. They are the Customs launch *Arayat* and, in her tow, a cutter-head suction dredge destined for Iloilo. Both vessels have been built at the Danzig Yards of the F. Schichau G.m.b.H., Elbing, to the order of the Philippine Government, the machine and dredging plants being the product of the firm's machine works at Elbing.

Counting these two ships, the number of craft built for the Philippine Government by the F. Schichau G.m.b.H., Elbing, now totals five, the others being the suction hopper *Dredge Manila*, Fig. 5, delivered in 1930, and the two lighthouse tenders *Canlaon* and *Banahaw*, both delivered in 1931. The latter is shown in Fig. 4.

The twin-screw Customs launch *Arayat* is destined for the coast guard service maintained by the Insular Customs Guard of the Department of Commerce and Communication of the Philippine Government. In addition to great speed, this vessel has the extraordinarily large radius of action of 5,700 nautical miles. Her main dimensions are the following:

Length over-all	66.615 m. (218-ft. 6 $\frac{3}{4}$ -in.)
Length between perpendiculars...	60.045 m. (197-ft.)
Beam	9.753 m. (32-ft.)
Height to upper deck	6.706 m. (22-ft.)
Draught in sea water	abt. 3.84 m. (12-ft. 7-in.)
Gross register tons	904
Net register tons	272

The Customs launch *Arayat*, which is seen in Fig. 2, has been built in accordance with the classification specification of the American Bureau of Shipping for Class 1 A 1 E and A M S, and under the supervision of this Bureau.

The ship has an inclined straight stem, a cruiser stern, a displacement rudder of streamline section, a funnel, and a signalling mast. The hull is subdivided by six water-tight bulkheads.

In order to arrive at the most favorable shape of the hull and the most appropriate propellers, extensive towing tests were made in the test tanks of the Hamburgische Schiffbau Versuch-

sanstalt (Hamburg Testing Station of Ship-building) at Hamburg, before the construction was started.

The quarters for the ship's officers, customs officers, and crew, numbering 62 in all, are very roomy and well ventilated to suit the service in the tropics. The officers' saloons and living rooms are fitted out practically throughout in polished rare woods. All the cabins and sanitary rooms have wash-stands with flowing water.

A plant for producing distilled drinking water has also been

installed, this being a safety measure provided for the event that the vessel may have to touch infected harbors.

The galley is fitted with two oil-fired kitchen ranges. For storing perishable food, refrigerating rooms of some 11 cu.m. (390 cu. ft.) capacity for meat and vegetables have been provided. The requisite low temperature is obtained from an NH₃ refrigerating plant. In addition, an apparatus for producing ice has been installed.

The equipment includes a 6.8 m. (22-ft.) long life-boat and a motorboat of the same length, also a tool boat of 5.5 m. (18-ft.)



Fig. 2.—Customs Launch "Arayat" on trials.

length. Davits have been provided in addition for a second motorboat.

The engine plant has been made of exactly twice the capacity of those of the lighthouse tenders *Canlaon* and *Banahaw*, with a view to obtaining ready interchangeability of spare parts with these two vessels. It consists of two triple-expansion engines, shown in Fig. 3, of 380, 630, and 1,000 mm. (15, 24 $\frac{7}{8}$ and 39 $\frac{3}{8}$ -in.) cylinder bores and 700 mm. (27 $\frac{5}{8}$ -in.) stroke. Their normal output is 2,100 indicated h.p., the maximum output being about 2,500 indicated h.p.

Steam is furnished by two single-ended cylindrical boilers of an aggregate heating surface of approx. 250 sq. m. (2,690 sq. ft.) and a working pressure of 14 atmos. (200 lb. per sq. in.). The boilers are equipped with Schichau-type oil firing, Howden forced draught, and Schmidt smoke-tube superheaters. The electric plant includes two turbo-generators of 15 kw. each.

To enable the ship to be employed also for the purpose of salvage, a salvage pump of 100 tons hourly capacity has been installed in addition to the pumps ordinarily required on board ship.

Extensive tests of the main and auxiliary engine plants were carried out under the direction and to the satisfaction of the Special Representative of the Philippine Government, who had also been acting in a consultative capacity for the design of the vessel and had supervised her construction. The trial runs were made in the offing of Danzig Bay past two points exactly a mile apart. The stipulated speed of 16 knots was considerably exceeded in these trials.

The dredge built by the F. Schichau G.m.b.H., Elbing, is a twin-screw suction steam-dredge with spud anchorage, of the following main dimensions:

Length over deck ...	...41.50 m. (136-ft. 2-in.)
Beam ...	...10.75 m. (35-ft. 3-in.)
Moulded depth ...	... 2.60 m. (8-ft. 6-in.)
Draught ...	... 1.40 m. (4-ft. 7-in.)
Maximum dredging depth...	9.50 m. (21-ft. 2-in.)
Dredging capacity ...	... about 300 cu.m. (400 cu. yd.) of sand per hour
Capacity of dredge pump ...	about 400 tons of water per hour
Gross registered tons ...	440
Net register tons ...	151

The dredge, shown in Fig. 1, is intended for river work at Iloilo on the Island of Panay. It has been built under the supervision of the Germanischer Lloyd in accordance with the specifications for the corresponding class of vessels. Special reinforcements have, however, been provided, to enable the dredge to travel under its own steam from its place of working to other harbors of the Philippine Islands. In the whole design of the vessel and of the dredging equipment, the large experience gained by the F. Schichau G.m.b.H., Elbing, in the construction of such special craft has been incorporated. Special attention should be called to the shallow draught of 1.4 m. (4-ft. 7-in.), which has been chosen in consideration of the low water depth of the rivers to be regulated. For this reason also the two screws work in tunnel-shaped recesses in the hull. The external appearance of the vessel plainly indicates that

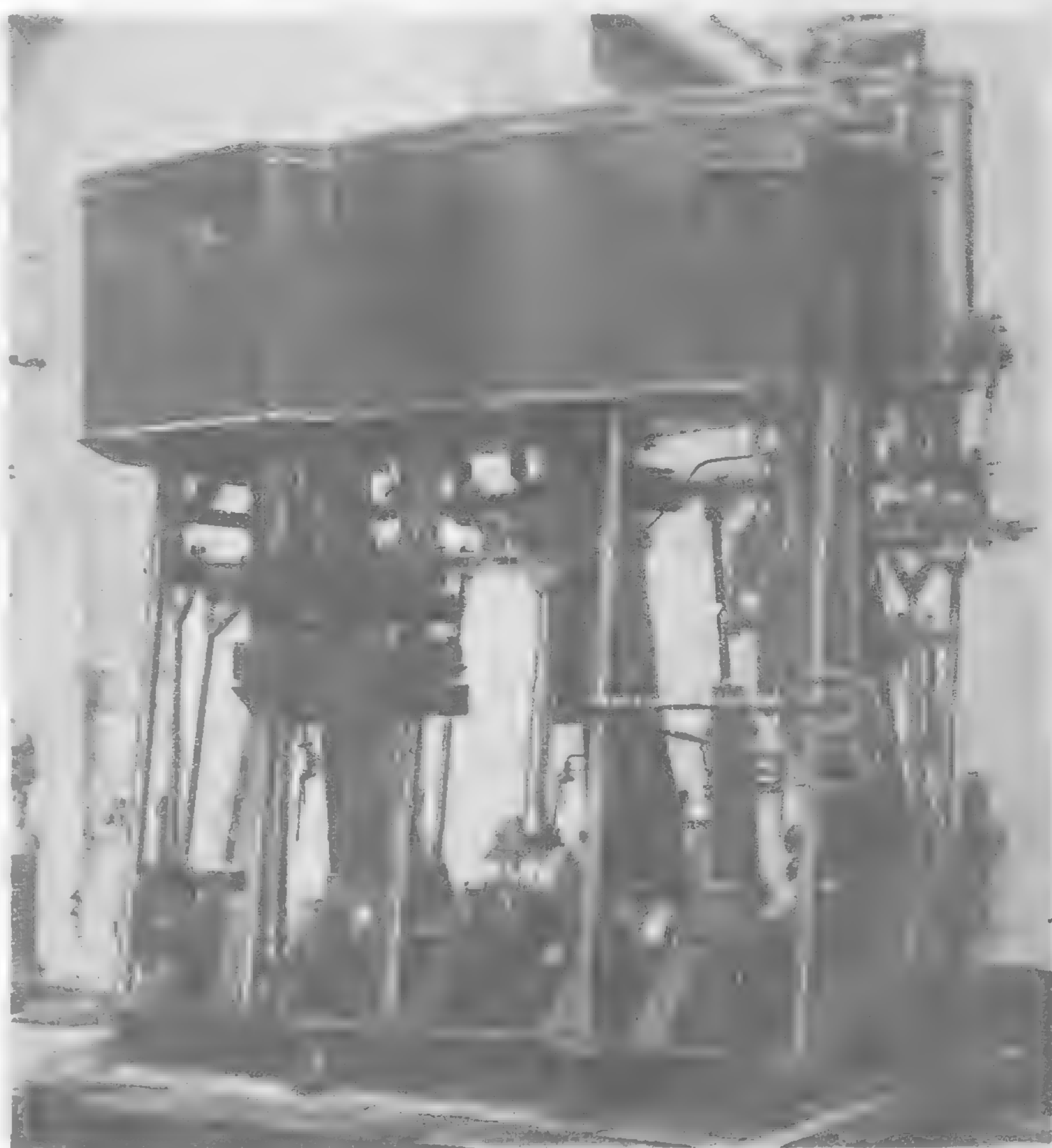


Fig. 3.—Triple-Expansion Engine of the "Arayat"

it is to be employed for service in the tropics. Roomy and airy accommodation has been provided for a crew of seventeen men.

Attached to the forward part of the vessel, is the suction pipe, which can be raised and lowered, and which carries at its outer end a rotary cutter head, seen in Fig. 6. The cutter head is a special construction designed by Dr. W. Thele, a German engineer, and protected by patent. The cut-up soil is drawn up through the suction pipe by the action of a powerful dredge pump, forced over board through pressure pipes, and either discharged into barges or conveyed to a dumping area on land by way of a floating pipe line connected to a discharge pipe on shore, as shown in Fig. 9.

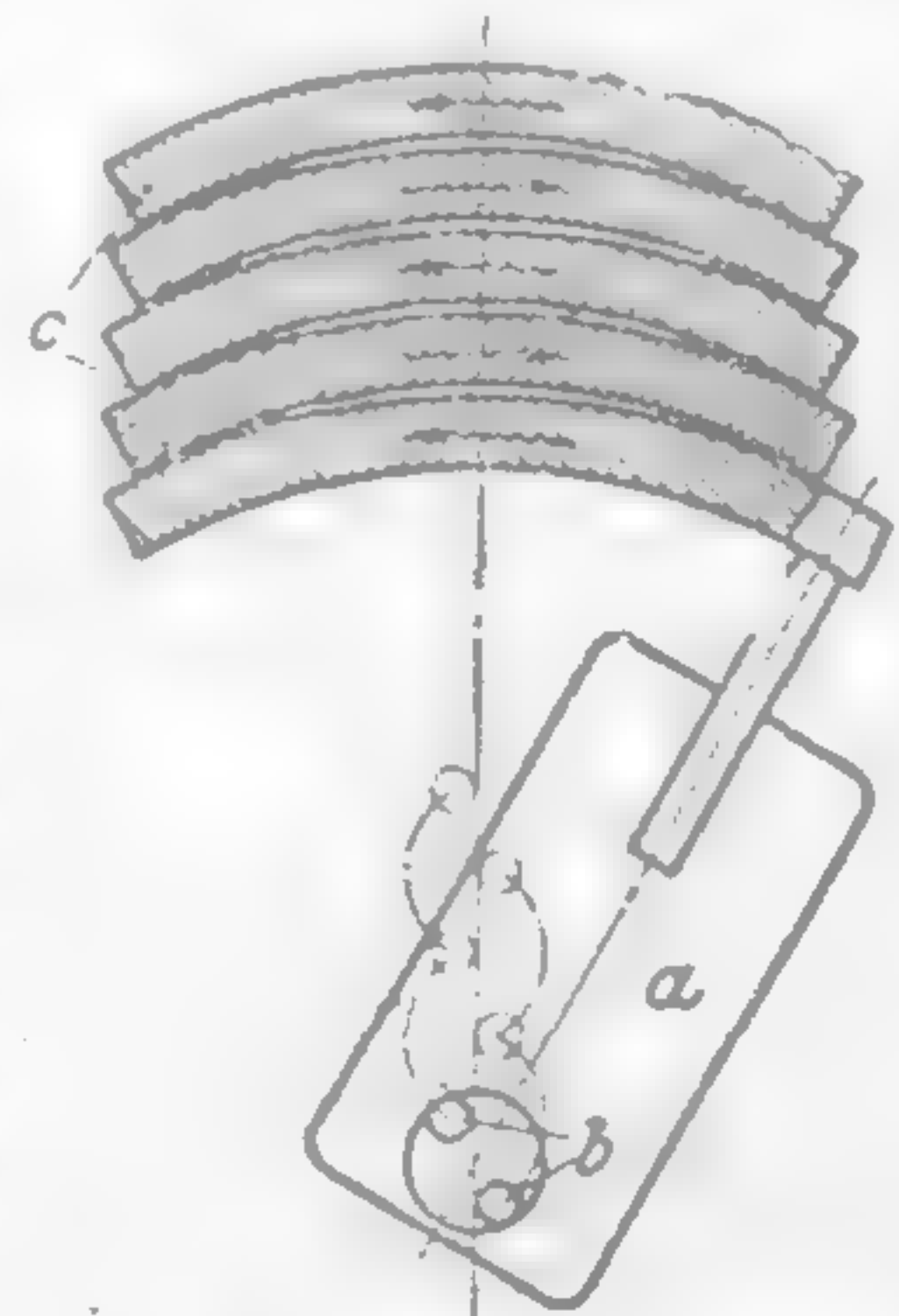


Fig. 7.—Cutter-Head Suction Dredge with Spud Cylinder and Auxiliary Support
(a) dredge, (b) spuds
(c) working area

At the stern of the dredge, two spuds are provided, one anchoring and one feeding spud, both arranged for vertical up-and-down movement. The dredge can swing round the feeding spud, driven into the bottom of the river bed, and can feed itself forward by the spud carriage sliding along a longitudinal slot in the hull. The anchoring spud serves for holding the dredge in place when, after completion of the feed, the feeding spud is being raised and shifted back into its initial



Fig. 8.—Suction Dredge discharging into a Barge



Fig. 9.—Similar Suction Dredge, built by F. Schichau G.m.b.H., discharging through Floating Pipe Line to Shore

working position in the slot. The swinging movement of the dredge is effected with the aid of anchors placed laterally of the bow and an appropriate distance apart. The anchor ropes pass over the drum of a winch located in the forecastle. By means of the two spuds, the dredge thus works its way over the ground to be dredged swinging to and fro and pushing itself forward.

A special feature of this dredge is the central winch, located in the forecastle. By its aid, the following operations can be executed and controlled from a central control stand on the deck above the winch: raising and lowering the suction pipe by means of pulley blocks on the boom located at the bow; lifting the spuds; manipulating the ropes of the side anchors and lifting the anchors. On the control stand, also the engine telegraph, draught indicators, and other apparatus of this kind are placed.

The vessel is equipped with two main engines, which are compound steam engines of 400 indicated h.p. each. When the ship is sailing, both are coupled to the propeller shafts; during dredging, the starboard engine drives the cutter head over several reduction gears and a reversing gear, while the port engine drives the dredge pump. Steam is supplied by a cylindrical boiler of 190 sq.m. (2,045 sq. ft.) heating area and 14 atmos. (200 lb. per sq. in.) working pressure. The boiler is equipped with Schichau-type oil firing and with a Howden forced draught plant.

Extensive tests and trial dredgings were made on the river Vistula in the vicinity of Danzig, under the supervision of the Special Representative of the Philippine Government, who had been assisting in an advisory capacity during the design and the construction of the vessel and had supervised the building work. On the trial trip, the



Fig. 4.—The Lighthouse Tender "Banahaw"



Fig. 6.—Cutter-Head and Suction Pipe lifted out of the water



Fig. 5.—Suction Dredge "Manila"

guaranteed speed of 7 to 7.5 knots was considerably exceeded. Mention should also be made of the fact that the F. Schichau G.m.b.H., Elbing, furnished for the dredge some 300 m. (1,000-ft.) of floating pipe line and 1,200 m. (4,000-ft.) of pipe for use on land. These are welded steel pipes of 400 mm. (15.8-in.) inner diameter. The floating line consists of 32 individual rafts connected by hose pieces of armored leather. Each raft is composed of two floats and the pressure pipe section. The dredge pump forces the dredged material through the floating line and the shore line directly to the discharge area.

After the trials, the dredge was partly disassembled and suitably encased and fitted for the sea voyage. A part of the pressure pipe line was also stowed on the vessel.

The difficult task of transporting the small dredge of rather light construction from Danzig on the Baltic Sea to Manila in the tow of the Customs launch *Arayat*, Fig. 1, was entrusted to a German crew under the command of a specially experienced captain.

During this voyage, the *Arayat* carried two of six three-wheel road motor rollers built at the Elbing Works of the F. Schichau G.m.b.H. to the order of the Philippine Government.

The two vessels left Danzig on October 10, 1931, and, passing Holtenau on the Kiel Canal, Gibraltar, Port Said, Aden, Colombo, and Singapore, safely arrived at Manila on February 6, 1932, after a four months' voyage. In spite of the fact that, during part of this voyage, they encountered very unfavorable weather and heavy seas, the transport was carried through without any mishap.

The voyage at the same time furnished the proof that the Customs launch *Arayat* is well qualified to tow other vessels.

Kobe has Y.480,000 New Customs Shed

The largest customs shed in Japan costing Y.480,000 has just been completed on Pier No. 4 in Kobe.

A three-storied building, 612 feet long and 126 feet deep, the new shed is the most up-to-date building of the kind in Japan. It can easily accommodate a vessel of over 40,000 tons.

It houses public stalls, the Japan Tourist Bureau office, telegraph, telephone and railway offices, a dining-room, a general waiting room, a special waiting room for distinguished people,

a bar, and even a "romance" room. There are also the Harbor officials' room, and a signal room on the top of the building. On the eastern side right along the second floor from north to south, is a wide balcony. Then on the western side of the building on the ground floor from north to south is a covered three-feet wide promenade along the boat train track.

There is also a gangway bridge which will connect ships and the balcony and which can be both raised or lowered according to the height of ships' decks.



The "Kaisoku Maru" on Trial

The Coastal Motor Tanker "Kaisoku Maru"

Equipped with Yokohama-M.A.N. Four-stroke, Airless-injection, Trunk-piston Engine

By Y. TAJI, M.I.N.A., M.I.Mar.E.

WHILST a number of high-speed motor tankers have been recently built in Japan for the transportation of heavy cargo oil from principal oil producing districts such as Southern California, Borneo, etc. to Japan, including m.s. *Teiyo Maru*, and m.s. *Fujisan Maru* it is also necessary to have oil-carriers of smaller type for the efficient and speedy distribution of heavy oil from these large ocean-going tankers to the service stations at important ports in Japan or to transfer oil from a shore station.

For such purposes, the *Kaisoku Maru* has been constructed by the Yokohama Dock Company, Ltd. to the order of Messrs. Nippon Tanker Kaisha, Ltd., the owners of m.s. *Teiyo Maru*.

The vessel was laid down in July 1931 and completed at the end of December 1931, to the entire satisfaction of both the owners and builders.

THE PRINCIPAL PARTICULARS are as follows:—

Length between perpendiculars	220' 0"
Breadth moulded	34' 6"
Depth moulded ...	18' 3"
Draught, fully loaded ...	16' 0"
Gross register, tons. ...	1,124
Dead weight, tons.	1,500
Trial speed, knots.	12.6
Normal b.h.p. ...	700

The vessel has been designed and constructed under many years experience of the Yokohama Dockyard in the oil tanker construction, and is classified as "First class Near-sea Service Vessel" under

special survey of the Japanese Ministry of Communications. The superiority in the hull construction, the general arrangement and equipment and the trial results have been recognized by visitors to the ship: particularly in view of the successful performance of the propelling machinery which is the Yokohama-M.A.N. four-cycle, single-acting, airless-injection, trunk-piston type Diesel solely manufactured by the Yokohama Dock Company.

General Arrangement and Hull Construction

The *Kaisoku Maru* is a full scantling vessel with single continuous deck extending over the whole length, a forecastle, a long poop and bridge structures. The vessel has a raked straight stem, a cruiser stern fitted with a Yokohama patent aerofoil-shape balanced rudder, a pole mast, twin derrick posts and a dumpy funnel, and her appearance is quite pleasing and well harmonized for this class of vessel.

The hull is subdivided by eight transverse watertight or oil-tight bulkheads and a longitudinal oil-tight bulkhead into boatswains' stores, a cargo hold, eight cargo oil tanks, a pump room and deep fuel oil tanks, machinery spaces and an aft peak tank. Cofferdams are constructed at the fore and aft ends of the cargo oil space, the forward one being utilized as a ballast tank when required. Between the aft cofferdam and the engine room, are



Yokohama Patent Aerofoil Balanced Rudder as fitted to the "Kaisoku Maru"



Main Engine of "Kaisoku Maru" on Test Bed

a pump room and deep fuel oil tanks at sides. Double bottoms are provided under the forward cargo hold and the machinery space, the former being utilized as a ballast water tank and the latter for the stowage of feed water, lubricating oil, etc. Fresh water is stowed in the aft peak tank.

On the flying bridge are a wheel-house, a chart room and a spare room, where all necessary navigation and communication appliances are provided. The captain's room and a spare room are arranged on the bridge deck. The poop is for the officers' accommodation with a comfortable modern style dining-saloon, a spacious galley, a pantry, a bath room, a lavatory, etc., whilst the fore-castle is for the crew's accommodation. Every precaution has been taken for the comfort of officers and crew, together with good ventilation and ample daylight.

The cargo oil loading and unloading arrangement is of the most up-to-date design, provided with two 100 ton cargo oil pumps of a horizontal duplex type and well disposed oil pipings.

The windlass, winches and steering gear are steam driven, all being manufactured by the Yokohama Dock Company. The steering gear is of a quadrant type directly coupled to a horizontal steering engine. The rudder is of the Yokohama patent stream-line balanced type invented by the builders, which has a characteristic of deforming to an aerofoil shape in accordance with putting helm on, and its superior steering and propulsive effects were well approved on sea trials and during her maiden voyage.

In view of the inadequate seaworthiness of oil tankers of smaller types hitherto built and of the consequent difficulty in keeping the scheduled days of navigation, the *Kaisoku Maru* has been designed to overcome such difficulties and not to have any significant reduction of speed, despite rough weather. Under such consideration, the ship is constructed with ample flare at bow, a steel hatch cover to the forward cargo hold, inclined front walls at the bridge and poop structures, open side rails at most parts of exposed decks, and a long flying passage linking the fore-castle deck, bridge and poop deck.

It is also worthy of note that the ship was so designed as to navigate quite safely at a light load condition with ballast water in ballast tanks only and not to use any of cargo oil tanks for ballasting purposes. This may be considered absolutely necessary for a vessel in very frequent loading and unloading of cargo oil.

Propelling Machinery and Auxiliaries

The machinery room is situated sternward, where a main engine, a generator, air compressors, a donkey

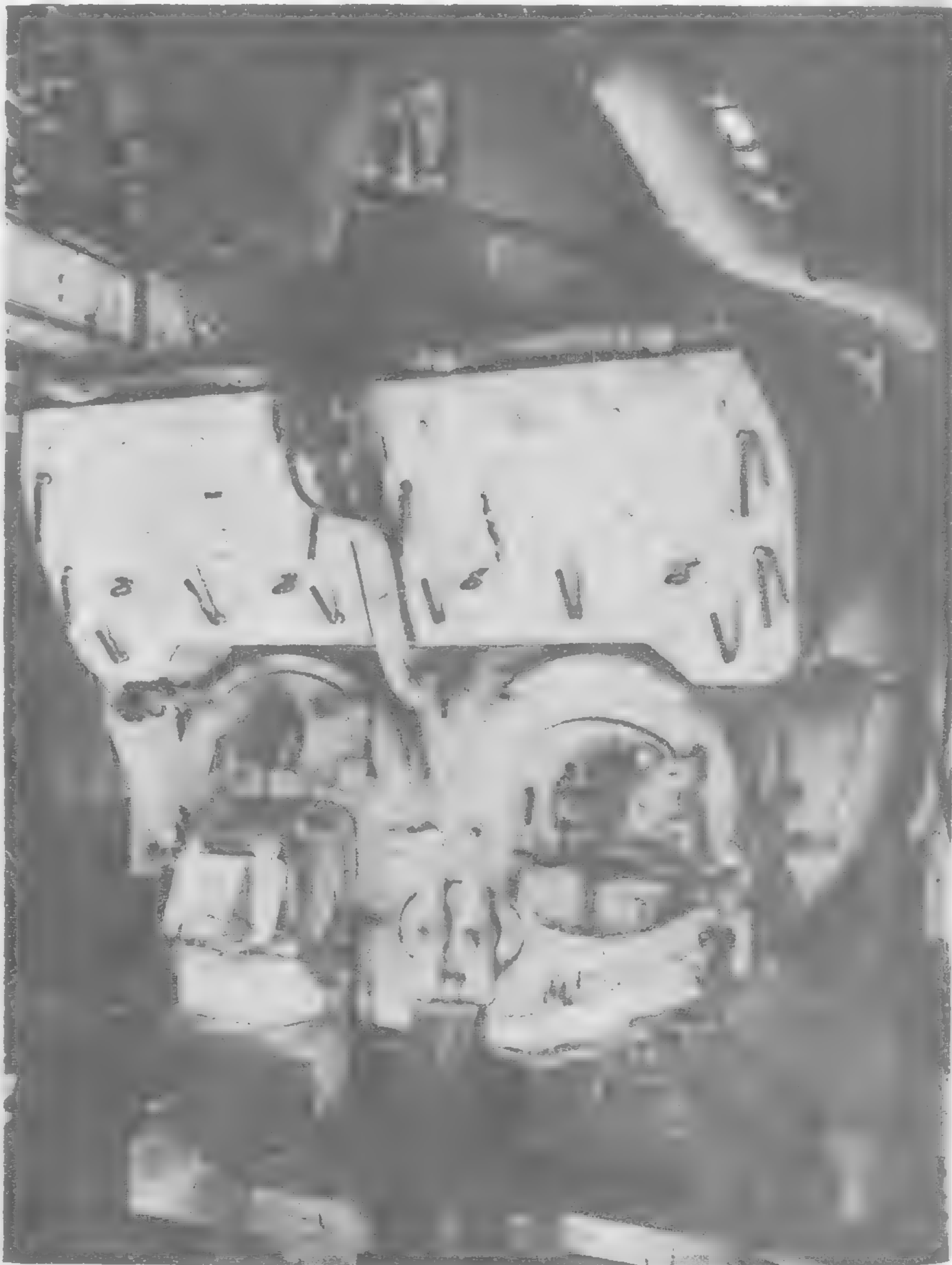
boiler and other necessary auxiliary machinery are installed.

THE MAIN ENGINE.—Is one set of the Yokohama-M.A.N. four-stroke, airless-injection, trunk-piston Diesel engine of Type GVU60 with six cylinders of 425 mm. in bore and 600 mm. in stroke, designed for a normal output of 700 b.h.p. at 230 r.p.m. The engine being self-contained, the independent drive of auxiliaries for propulsion is almost unnecessary, which has rendered the electric driven auxiliaries to the minimum in number and considerably simplified the engine room arrangement without impairing the economic efficiency.

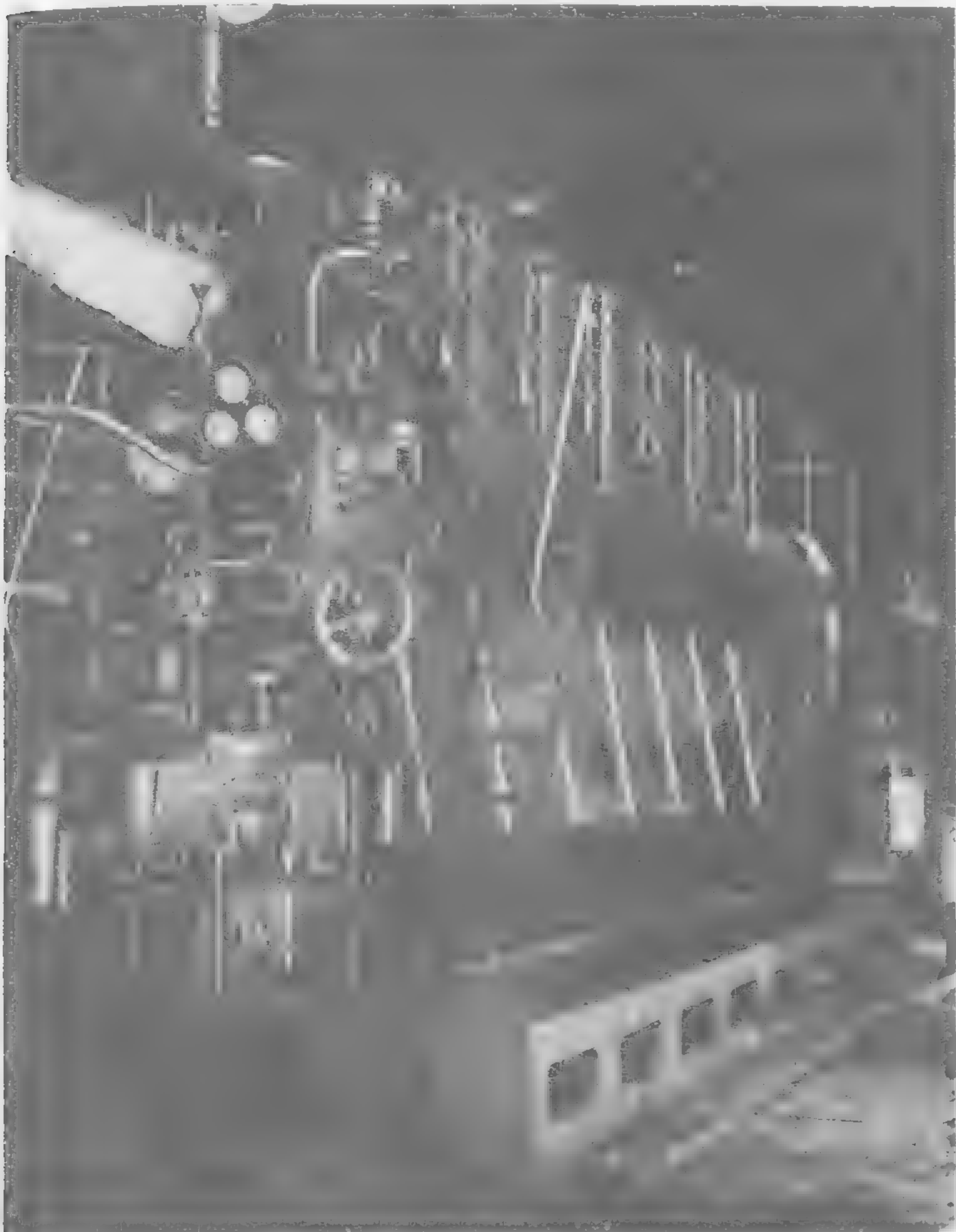
In accordance with the M.A.N. standard practice, the bed plate, frames and cylinders are of cast iron and are firmly fastened together by four long stay bolts to constitute the main body of the engine and to prevent from incurring of tensile stress to these castings by means of transmitting the combustion pressure on the cylinder covers to main bearings on the bed plate. Consequently, the casting is made as light as permissible, whilst the whole engine body is constructed as a deep strong built-up beam to withstand the bending moment due to the inertia force of moving parts and also to prevent vibration.

Cylinder covers, jackets and liners are of special cast steel and are separately made for easy renewal and inspection. Piston connecting rods, crank shafts and main bearings are of usual construction.

Fuel injection is effected by the well-known M.A.N. system, comprising fuel pumps and water-cooled open-type fuel-injection valves fitted individually to each cylinder. The combination of these pumps and valves is, as is easily perceptible, very reliable and durable, and attained a record of fuel consumption at 168



Yokohama Patent Exhaust Gas and Oil Burning Boiler as installed on the "Kaisoku Maru"



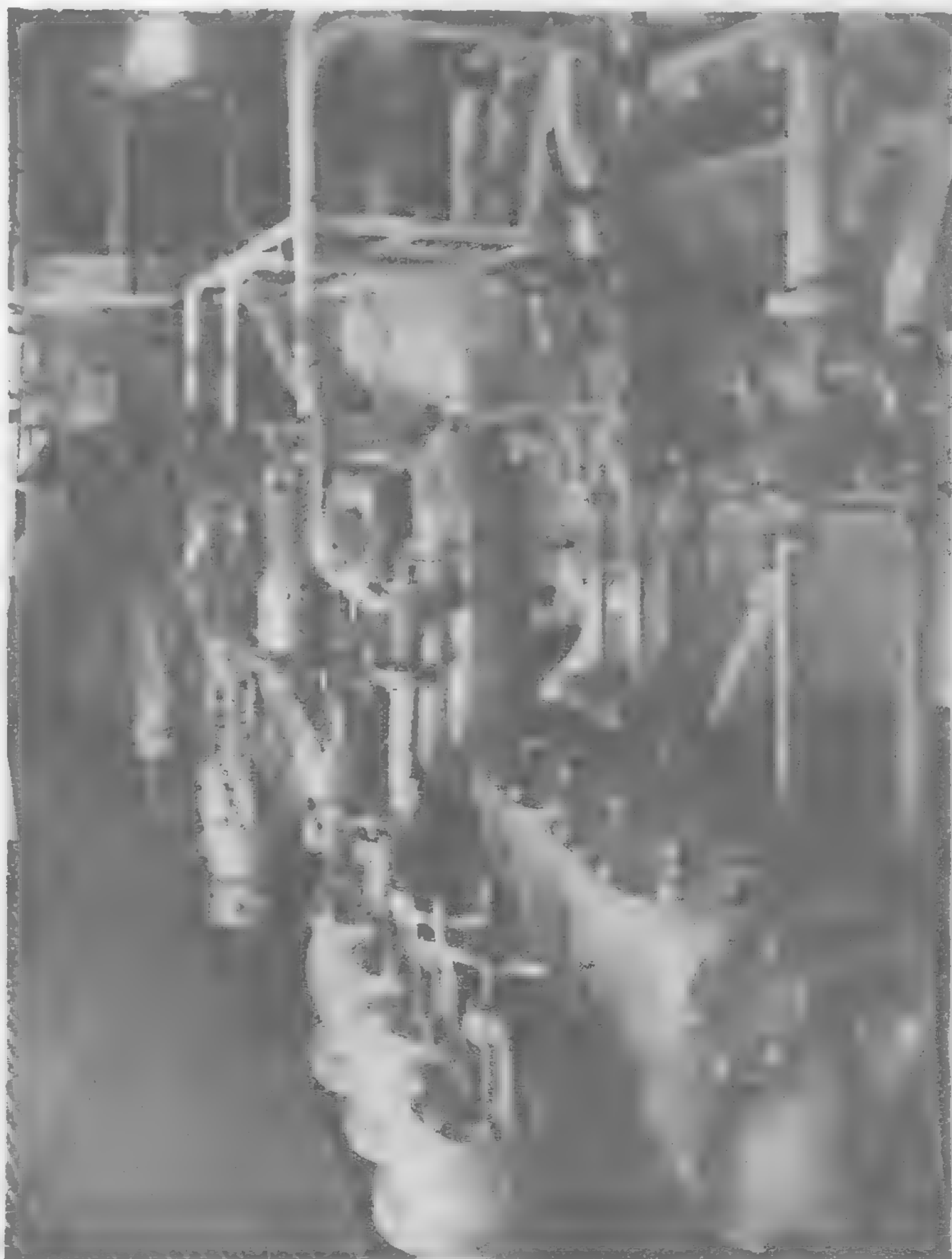
Main Engine showing Control Side



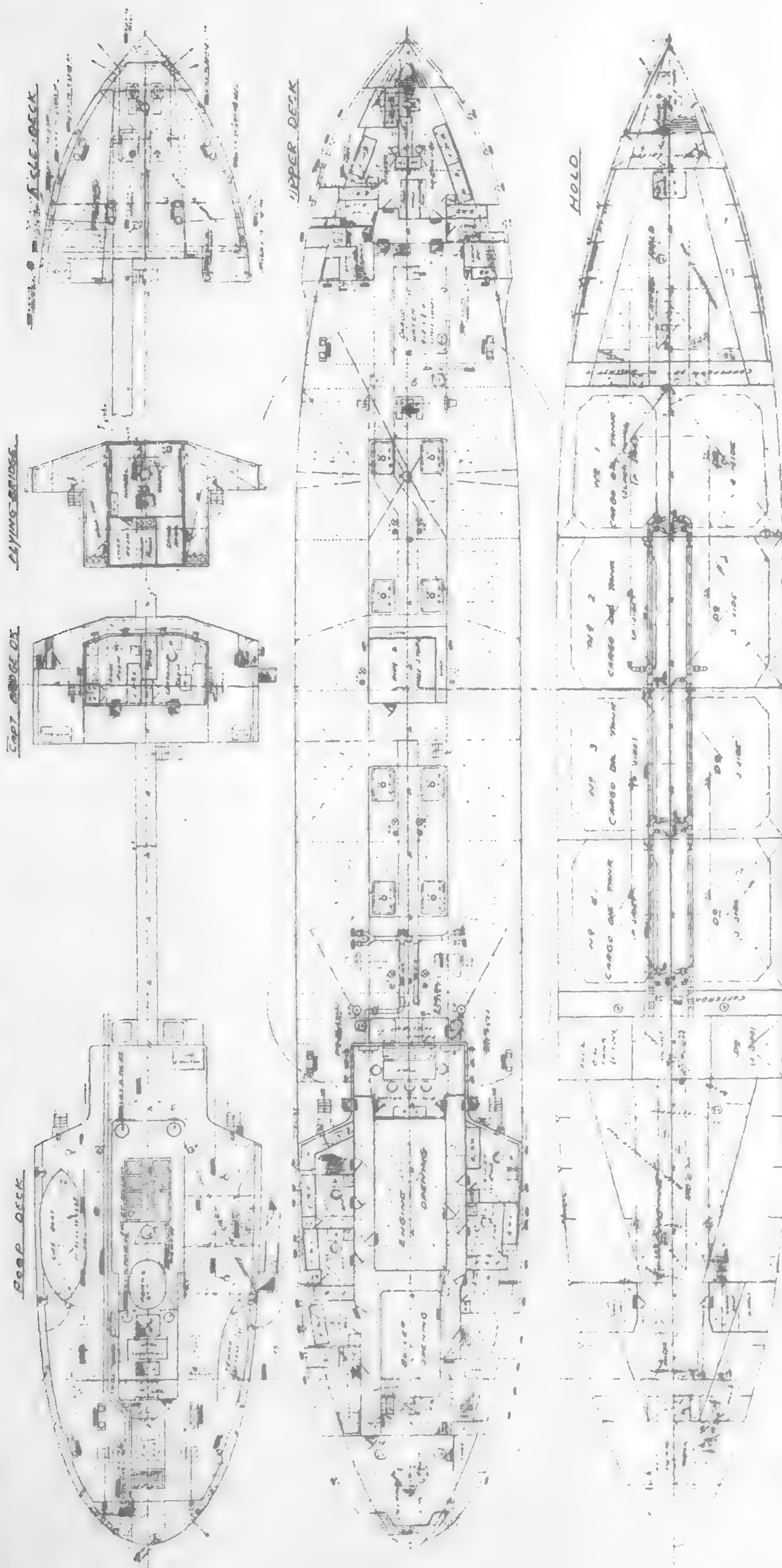
Tops of Cylinder Covers



Engine Room showing Port Side



Engine Room showing Starboard Side



Arrangement of Vessel showing Decks

grams per b.h.p. per hour in the shop tests, whilst on the overload sea trial, exhaust gas was very clear even at a mean indicated pressure of 8 kgs. per sq. cm. and still showing placidity of the engine. On the maiden voyage, quite viscid Californian oil with a viscosity of 321 sec. by the Redwood at 20 deg. centigrade was used as fuel. After the completion of the non-stop return journey, the engine was overhauled for inspection and it was found that the cylinders were in such a good condition that cleaning was absolutely unnecessary.

The starting and reversing of the engine is effected by compressed air and oil pressure, dispensing with manual power. The superiority of mechanism combined with the automatic operation of starting valves enables the handling of engine from full ahead to full astern by only five or six seconds. The starting and reversing handles being interlocked, no mishandling will take place in the manoeuvring operation.

The lubricating oil pump, cooling water pump and bilge pump are directly connected to the engine at its forward end, and an electric turning gear is fitted for easy adjustment and overhauling of the engine.

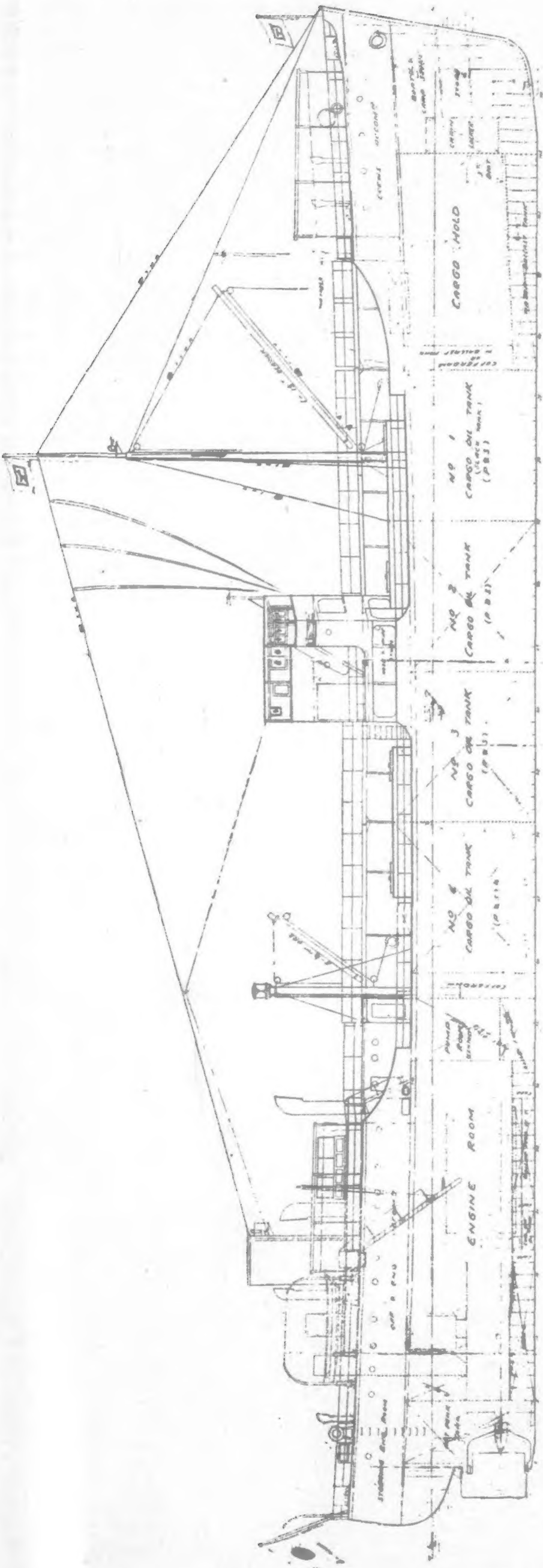
As mentioned above, the fuel consumption at shop trials was 168 grams per b.h.p. per hour or 136 grams per i.h.p. per hour.

AUXILIARY BOILER.—A Yokohama patent combined exhaust-gas and oil fuel burning boiler of 7-ft. 6-in. in diam. and 5-ft. 8-in. in length is installed in the boiler room on the platform deck abaft the engine room, for supplying steam to two 100 ton cargo oil pumps and other steam-driven auxiliaries, as well as for the heating of cargo oil and living quarters whenever necessary. The boiler is of a marine cylindrical type, designed under the same principle as in the exhaust gas boiler installed in m.v. *Teiyo Maru*, but the construction is slightly different.

In the combustion chamber are a number of vertical water-tubes connected to a horizontal water drum at bottom, whilst two furnaces are fitted with the Yokohama simple oil-fuel burners using steam or compressed air for blowing fuel in. One of the furnaces is for oil-burning only, and the other is for exhaust gas as well as for oil.

The main engine being a four-cycle type, the exhaust temperature at the normal output is about 450 degrees centigrade which can be effectively utilized through waste heat passage of the boiler so as to reduce the fuel consumption of the boiler to a minimum and sometimes not to necessitate fuel oil burning at sea.

ELECTRIC GENERATOR.—As stated before, the main engine being self-contained, there is practically no electrically driven auxiliaries in the engine room. Consequently, only one set of 7.5 kw. 110-volt steam-driven D.C. dynamo is installed therein for lighting and electric fans. Actual electric consumption at sea having been in the neighborhood of 4 kw. in average, the generator capacity is sufficient for the purpose.



Arrangement of Vessel showing Engine Room, Oil Tanks and Hold

AIR COMPRESSORS AND RESERVOIRS.—In order to supply starting and reversing air to the main engine, a steam-driven air compressor, a hand-driven air compressor, two main air reservoirs and an auxiliary air tank are provided in the engine room, which also supply air to fuel oil burners of the donkey boiler.

ENGINE ROOM AUXILIARIES.—Apart from those mentioned before, the following auxiliaries are installed in the engine room :—

- 1—Spare lubricating oil pump of electric rotary type.
- 1—Fuel oil transfer pump of the same type.
- 1—De Laval electric lubricating oil purifier.
- 1—Spare cooling water pump of a steam-driven vertical Duplex type.
- 1—General service pump of the same type.
- 1—Bilge pump of the same type.
- 1—Feed pump of steam-driven vertical Simplex type.
- 1—Lubricating oil cooler.
- 1—Auxiliary condenser.
- 1—Feed water filter, etc.

Trial Results

The full load progressive trials were carried out on December 17, 1931, off Tateyama near the entrance of the Bay of Tokyo, and the full power official trial on December 19, 1931, the result being given below :—

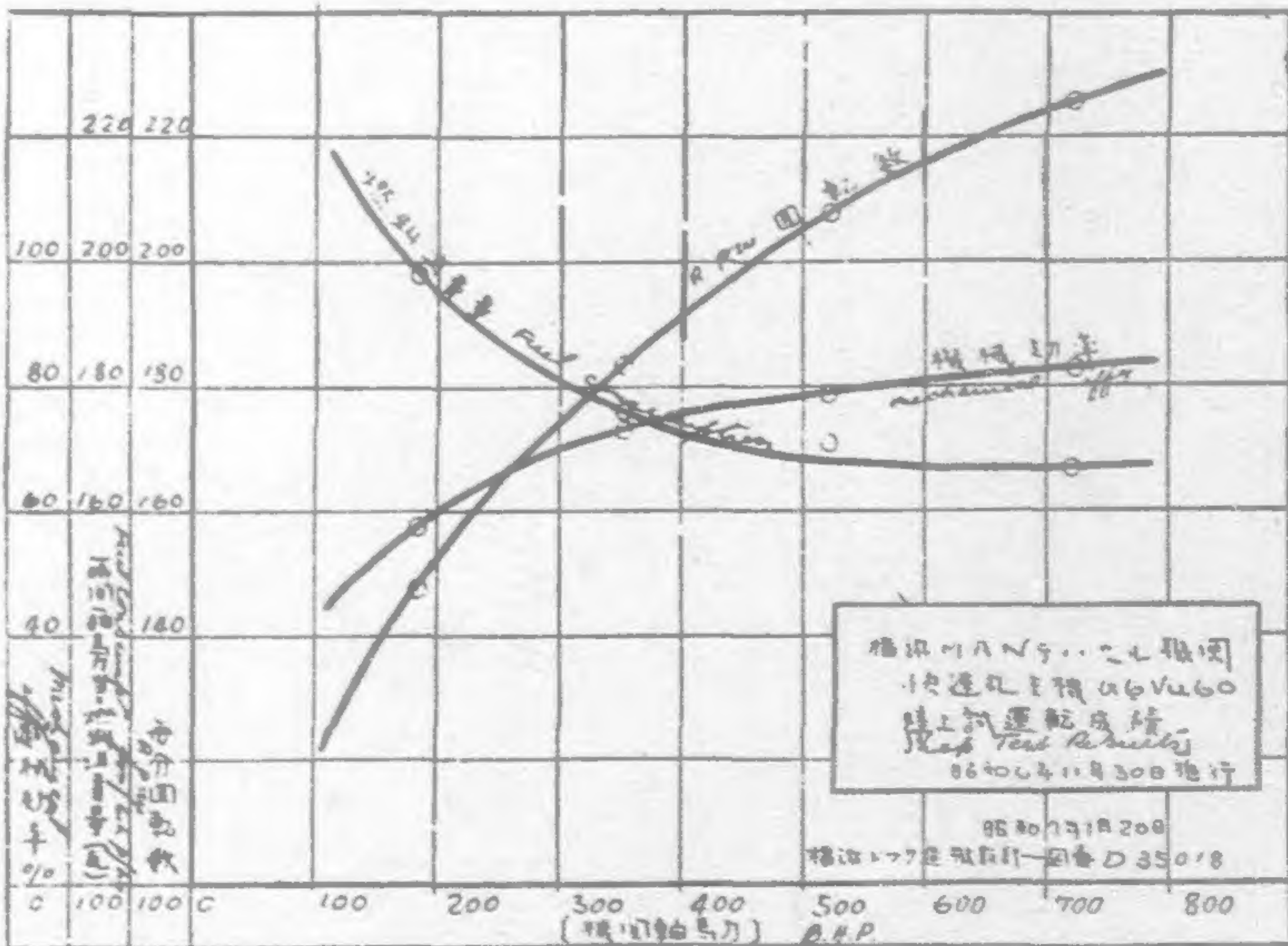
FULL POWER OFFICIAL TRIAL

Draught, mean	...	...	...	9-ft. 3-in.
Corresponding displacement, tons.	...	...	...	1,198
Mean speed, knots	...	...	...	12.555
R. P. M., mean	...	...	...	224.2
B. H. P.	...	...	...	873
I. H. P.	...	...	...	1,009

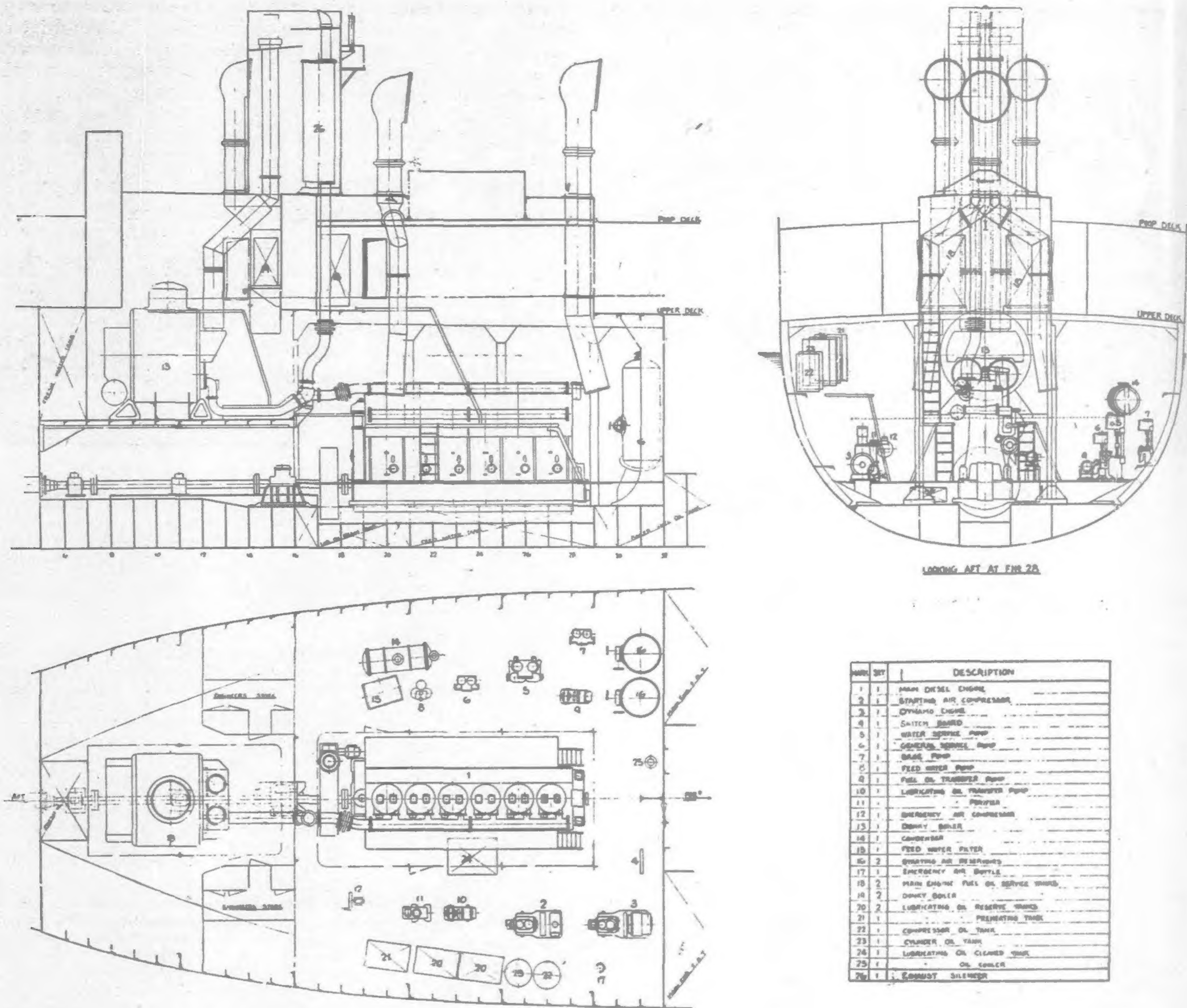
The result of shop trials of the main engine is shown in the graph attached.

In the starting and reversing trials, one air reservoir of 1,500 litres at 30 atms. was used. The pressure fell down to 11 atms. after having repeated twenty-three times the reversing operations from ahead to astern alternately, whilst it was quite possible to start the engine at an air pressure up to 7.6 atms.

So far as trial records of vessels of some 220 feet long are concerned, the Admiralty coefficient at nine to 10 knots has been usually 220 to 250, whilst in the *Kaisoku Maru* a figure so high as 330 to 360 was obtained, which may be considered as the significant result of combined efficiency of the hull and machinery, together with the Yokohama patent aerofoil rudder and the propeller.



Shop Test Results



General arrangement Engine Room

“Patriotism” Air Squadron

(Continued from page 218)

Kochi Prefecture is located at a strategic point where a formidable air base could be established to defend not only the commercial centers of Osaka and Kobe, but also the naval bases of Kure and Hiroshima. The proposal to donate the aviation ground met with the enthusiastic approval of the War, Navy, and the Communications authorities. As a result, a 10,000 tsubo or a little larger than eight acre aviation ground will be established in the neighborhood of Kochi city with the public donation of Y.80,000 instead of the donation of an airplane.

Defense of Cities

Coincident with the donation of “Aikoku” airplanes to the army and navy, another movement aimed at the defense of commercial cities against an aerial invasion was started in different parts of the country, especially in Osaka. In Osaka, more than Y.700,000 fund was soon raised by public donation when the campaign was started under the joint auspices of the Osaka Prefectural Government, the Osaka Municipality, the Osaka Chamber of Commerce and Industry, and the 4th Division of Osaka, supported by the *Osaka Mainichi* and the *Osaka Asahi*, two dailies which are the most influential of all the newspapers in Japan.

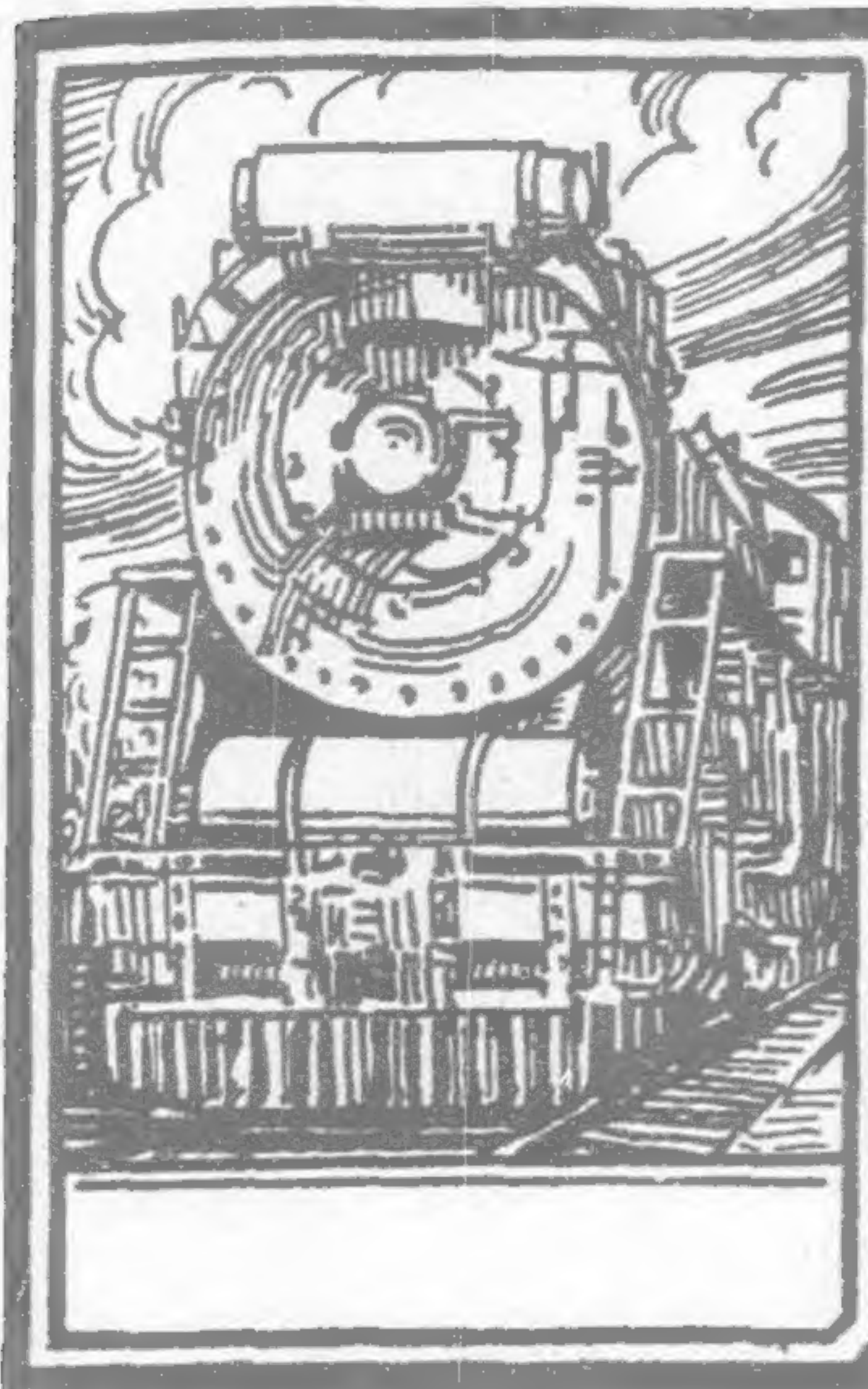
It was estimated that the donation may easily reach the expected sum total of Y.1,000,000 by the end of May, 1932, when the acceptance of the donation is to be closed.

With the Y.1,000,000 fund thus raised, it is planned to equip the city with a number of anti-aircraft guns.

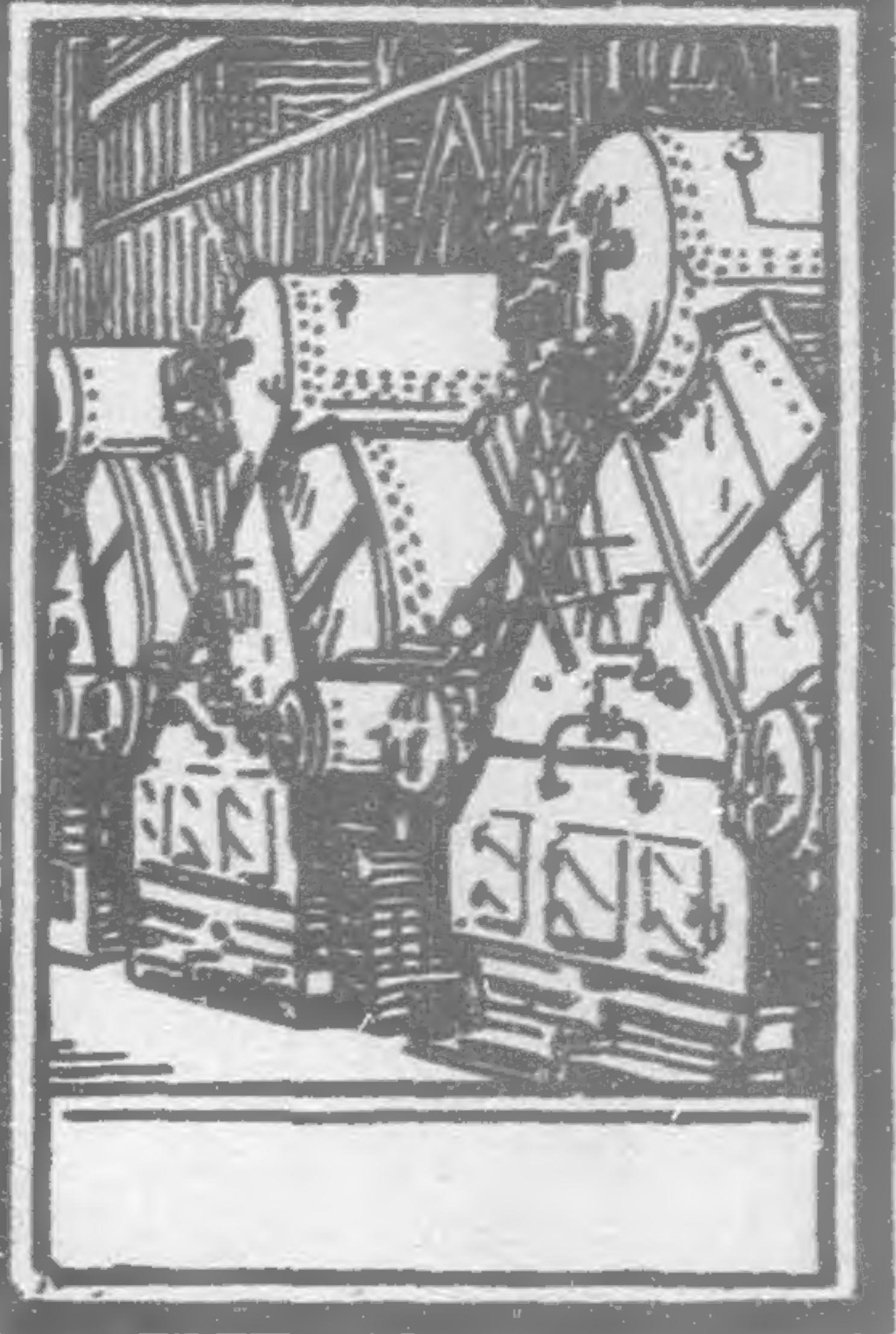
There are two programs: one is, to create two anti-aircraft artillery corps equipped with four 10-centimeter guns and two more anti-aircraft artillery corps equipped with eight 7-centimeter guns, at the cost of Y.906,000. The other is, to create one anti-aircraft artillery corps equipped with two 10-centimeter guns and three more corps equipped with twelve 7-centimeter guns at the cost of Y.942,000.

It costs Y.208,500 to create one anti-aircraft artillery corps equipped with two 10-centimeter guns. The details are: two 10-centimeter anti-aircraft guns, Y.70,000; one search-light, Y.60,000; two audiphones, larger one, Y.8,500, and smaller one, Y.6,000; one range finder, Y.50,000; 200 shells, Y.14,000.

To create one anti-aircraft artillery corps equipped with four 7-centimeter guns costs Y.244,500. The details are: four 7-centimeter anti-aircraft guns, Y.104,000; one search-light, Y.60,000; two audiphones, larger one, Y.8,500, and smaller one, Y.6,000; one range finder, Y.50,000; 400 shells, Y.16,000.



ENGINEERING NOTES



INDUSTRIAL

THORNYCROFT AWARDS.—Amongst the half dozen or so Thornycroft omnibuses exhibited at the last Olympia Show, there were two which gained awards offered by the Institute of British Carriage and Automobile Manufacturers. Both these vehicles were on the new types of Thornycroft omnibus chassis, introduced for the first time at the Olympia Show, which one transport authority eulogized as "an important contribution to the progress of passenger chassis design."

AMERICAN-JAPANESE REFINERY.—Of no little interest is a scheme now completed by which a Japanese distributing company and a California producing company have combined to erect a refinery in Japan to be supplied with crude oil from California. As magnitudes go nowadays the refinery is not a large one, having a capacity of 4,000 barrels of crude daily. But it is quite large enough to try out such an arrangement on a commercial scale; and the crude capacity is not so much an index to its importance as the fact that it includes a combination topping and cracking unit having a throughput of 3,000 barrels per day and a lubricating unit having a throughput of 1,000 barrels per day. The Japanese company is the Mitsubishi, which for some years has been the distributor of associated oil companies products in Japan.

JAPAN'S ROADS.—According to Mr. Masuki Fujii, chief engineer of Research Office, Public Works, Home Affairs, Tokyo, the Japanese Government has allotted about 15,000,000 dollars for highway construction this year, as a form of unemployment relief. Under this programme high type surfaced roads are to be constructed as follows:—Concrete, 60 miles; cold laid or emulsion asphalt treatment, 40 miles; penetration sheet or hot asphalt, 60 miles; and surface treatment with heavy oil, 20 miles. Generally the methods followed in construction and application are similar to those in use in the United States, except that hand labor is used whenever possible.

HONGKONG FERRIES.—The Hongkong Government has accepted the tender of the Hongkong and Yaumati Ferry Co., Ltd., for the vehicular ferry service between the island and Kowloon. When completed, the ferries will run between Jubilee Street Pier and Jordan Pier, Jubilee Street Pier and Mongkoktsui Pier; and Jubilee Street Pier and Shamshuipo Pier. If possible, the service will commence operations on January 1, 1933. The vessels for the service, other than special type vessels, must be steam or motor, of a service speed of not less than 10 knots. The special type vessels must be fitted with Diesel engines. The ordinary vessels must during the first year be sufficient in number to maintain a ten-minutes' service and have accommodation for not less than 250 passengers. During the second and subsequent years must be sufficient to cope with all traffic requirements.

AMERICAN PRODUCTS SHOWN.—American manufactures were exhibited in large numbers at the annual Soerabaja, Java, fair, which closed in October after 15 days' duration. American automotive products, cigarettes, and different brands of foodstuffs were especially well represented.

FLOATING CANNERIES MERGE.—The plan for the amalgamation of four floating cannery companies was practically completed when the Nippon Floating Cannery Company at its recent shareholders general meeting decided to increase its capitalization to seven million yen for the purpose of buying up the other three companies, namely, the Hayashi Kane Floating Cannery Company, the Showa Floating Cannery Company and the Azuma Floating Cannery Company.

HONGKONG WATER SUPPLY.—Hongkong awaits the Secretary of State's approval of the big second Shing Mun water supply scheme, a costly venture to be paid for from loans, but which is vital to the Colony. The scheme involves the construction of a much larger dam than any at present in the Colony; the height of the dam will be 200-ft. and the reservoir when completed will contain 3,000 million gallons. This work is now under consideration by the consulting engineers. Other portions of the scheme, such as the smaller reservoirs and catchwaters, will be undertaken departmentally.

SINGAPORE CEMENT FACTORY.—A step of some importance in the development of Singapore as a manufacturing town has been taken by the well-known firm of civil engineers and contractors, Messrs. Fogden, Brisbane and Co., who have applied for permission to erect a factory for the manufacture of cement products. When the Governor (Sir Cecil Clementi) opened the Manufacturers' Exhibition he revealed that the Hongkong Green Island Cement Co. had approached Government with a view to acquiring a site for a replica of the company's new plant just installed at Kowloon. The site for a cement factory in Singapore would have to have, as the model indicates, rail, road and sea access, and a favored site is in the Pasir Panjang district. Though Singapore island has actually no known large limestone deposits it abounds in the variety of mud needed, and limestone cliffs are a feature of the contour of the Peninsula.—*Eastern Engineering and Commerce.*

NEW RUSSIAN PLANTS.—Three hydro-electric plants with a total capacity of 1,000,000 kilowatts will be erected following the publication of the decree concerning them, signed by Molotoy and Stalin on behalf of the Council of the Peoples' Commissars of the Central Committee of the Communist Party. Two of the plants, it was announced will be on the Volga, one in the Ivanova Voznessensk district, the other at Miuni Novgorod. The third plant will be erected on the river Kama.

PETROLEUM FROM MEXICO.—Japan has turned to the Mexican market for petroleum, says a Reuters Trade Service message from Mexico City. Heavy shipments of crude oil have been reported passing from Tampico to Manzanillo on their way to the Orient. The National Railways have contracted to move some 30,000 barrels of crude oil a day to Manzanillo.

OSAKA'S NEW BRIDGE.—Osaka Prefecture has officially opened the Juso Ohashi, a Y.2,000,000 steel bridge across the Shinyodogawa, directly west of the Hankyu interurban girders. The construction work for the bridge, which is one of the most important links of the Osaka Prefectural highway leading from Osaka to Ikeda began in January, 1930, and cost the Prefectural Government Y.1,970,000 to build. It is 2,520 feet long, or nearly half a mile, and is 66 feet wide, girders and trusses used in the construction weigh, all told, 6,235 tons.

RADIO SERVICE RE-OPENS.—The Northeastern Telegraph Administration under the Ministry of Communications, State of Manchoukuo, has completed negotiations with RCA Communications, Inc., a subsidiary of the Radio Corporation of America, for the resumption of the high-speed direct radio-telegraph service between Manchoukuo and America, it is announced by Mr. Pai Hsi-tso, Assistant Chief of the Telegraph Administration, whose headquarters are in Mukden.

JAPAN BUYS WIRE.—Large Japanese orders will fully employ Bestag's rolled wireworks at Hochfeld near Duisburg for a long period. It is stated that the orders are not connected with the Sino-Japanese conflict. The Bestag is the largest and most modern works in Germany but owing to lack of orders has been partly closed down for some time in the past.

TOKYO CITY HALL.—In keeping with the needs and dignity of the Greater Tokyo, which is expected to come into being in the near future, the Tokyo Municipal Government has drafted plans for the construction of a Yen 10,000,000 city office. The new city office, according to present plans, will be a seven story structure costing Yen 8,000,000 and will be situated on the 6,000 tsubo site at Otemachi, formerly occupied by the Gendarmerie Corps. The lot is expected to cost Yen 2,000,000. The building, it is said, will be the last word in modern architecture. Its total floor space will be 17,000 tsubo. It is hoped to commence work in the building during the 1932-33 fiscal year.

NEW POWER STATION.—The Yahagi Hydro-Electric Power Co., of Japan, has received permission to erect the proposed Taifu power station on the Tenryu River. The station will have a capacity of 52,000 kw. instead of 25,000 kw. as originally planned.—*Eastern Engineering and Commerce.*

AVIATION

DUTCH AIR MAIL.—According to the *Telegraaf*, Amsterdam, the directors of the K.L.M., by buying five new Fokker aeroplanes, desire to assure a still greater regularity of the service to the Dutch East Indies than at present. It seems that the various distances on the line to Batavia are too long for planes with a speed of 165 kilometers, especially if the weather is bad. The new planes will have a cruising speed of 200 kilometers, and will thus be able to travel comfortably even if they encounter head winds or bad weather.

NANKING PROJECTS.—A field covering 3,500 mow outside the Tungchi Gate has been chosen as site for a Central Airdrome by the Chinese Aviation Department. \$400,000 has been earmarked for the construction of a meteorological station on the peak of Tzechin Mountain. Of this, \$30,000 will be for roads to the station, and the remainder for the purchase of equipment from abroad.—*Eastern Engineering and Commerce*.

LINE IS OPENED.—The Eurasia Aviation Corporation announces that the North-Western line has been inaugurated. Every Friday morning at 7 o'clock, an Eurasia aeroplane will fly from Nanking to Loyang and Peking carrying both mails and passengers.—*Reuter*.

SHANGHAI-BERLIN ROUTE.—The administration of German airways is said to have reached an understanding with the Soviet authorities for the purpose of running the Berlin-Nanking-Shanghai air line via Moscow, Omsk, Turkestan, the Gobi desert and Peking. The line is believed to be put partly in operation in May.—*Havas*.

CANTON MAKE LOAN.—To secure more funds for the development of the Canton Air Force, General Chang Hui-chang, commander-in-chief of the local air fleet, has authorized the issue of premium bonds to the value of \$5,000,000. It is expected that the first drawing has been fixed for September 1. The air authorities are planning to build up a strong fleet for national defence with particular reference to the security of Canton and its environs.

RAILWAYS

KIAOCHOW-TSINAN EXTENSION.—A number of branch lines will be built to connect with the Kiaochow-Tsinan Railway, the object being to earn enough revenue for the redemption of the railway from the Japanese. The first line to be built runs from Tsinan to Taokow, a distance of 100 kilometers. The estimated cost is \$6,000,000, but half of this can be saved by using the 60-pound rails and bridge-building material taken from the main line, while the balance of the cost will be met from the British portion of the Boxer Indemnity. As to rolling-stock, requirements can be supplied from the main line. The second proposed line, 200 kilometers, is from Poshan to Tawenkow, connecting with the Tientsin-Pukow Railway. This zone is rich in coal deposits. The cost of this line, however, will be exceedingly high, as some mountainous country has to be crossed. A third line under consideration is 30 li long, extending from the Poshan colliery to the railway. Between these two points a light railway is now operated.

NEW RAILWAYS IN JAPAN.—The following electric railways have recently been chartered:—Doyko Electric Railway from Abutamura, Abuta-gori, Iburi, Hokkaido to Higashi-Kuchiyasu-muru (42 km.); Numobiki Electric Railway (8 km.), between Mita-Mimaki-mura, Kita-Saku-gori, Nagano-ken, and Honmoku-mura, at a cost of Yen 300,000; the Keiham Electric Railway (2 km.), between Senri-mura, Mishima-gori, Osaka-fu, and Yamada-mura (Yen 600,000); the Toshima Seacoast Railway (20 km.), between Shikaba-mura, Kayabegori, Kokkaido, and Usujiri-mura (Yen 1,110,000); and the Kochi-Ganan Railway (16 km.), from Shioye Kochi City (Yen 632,734).—*Eastern Engineering and Commerce*.

FERRY ACROSS YANGTZE.—An agreement has been signed between the Chinese Ministry of Railways and the Trustees of the British Boxer Indemnity for a loan of £400,000 sterling, for the construction of the railway ferry across the Yangtze River connecting Pukow with Hsiakwan, Nanking, the materials for which will be imported from Great Britain.—*Eastern Engineering and Commerce*.

MOSCOW BUYS LOCOMOTIVES.—Soviet Russia laid 8,000 miles of track in 1930 and 1931, is now electrifying its railroad system extensively and expects to order 3,000 more locomotives from the United States between now and the coming summer, said Charles A. Gill, superintendent of motive power of the B. & O. Railroad, when he returned from Europe to the U. S. Mr. Gill sailed for Russia, February 10, 1931, at the head of 150 American experts to assume, at the invitation of the Soviet Government, the position of consulting chief of its railroad service. Russia has 50,000 miles of track laid at present and 17,000 locomotives, he said, and the Government expects to lay several thousand more miles of track in 1932.

WORK ON JAPANESE LINE.—The modernization of the Tokaido line of the Japanese Government Railways will be completed within the year, it has been learned, with an expenditure of Yen 780,000, terminating the seven year program of improvement inaugurated in 1925, with a total estimate of Yen 14,400,000. With the completion of approximately 52 kilometers remaining at present, the whole track will be laid with 100 lb. rails. It is expected that the heavier rails will diminish the vibration of the coaches, increase the speed of the trains, making for greater safety and increased transportation capacity. The first 24 meter length rails will be also laid

for a distance of one kilometers between Tenryu river and Hamamatsu. These rails are twice the length of the common rails in Japan. They are expected to diminish the vibration of the trains and to reduce the cost of maintenance, due to the reduction of the number of joints by half.

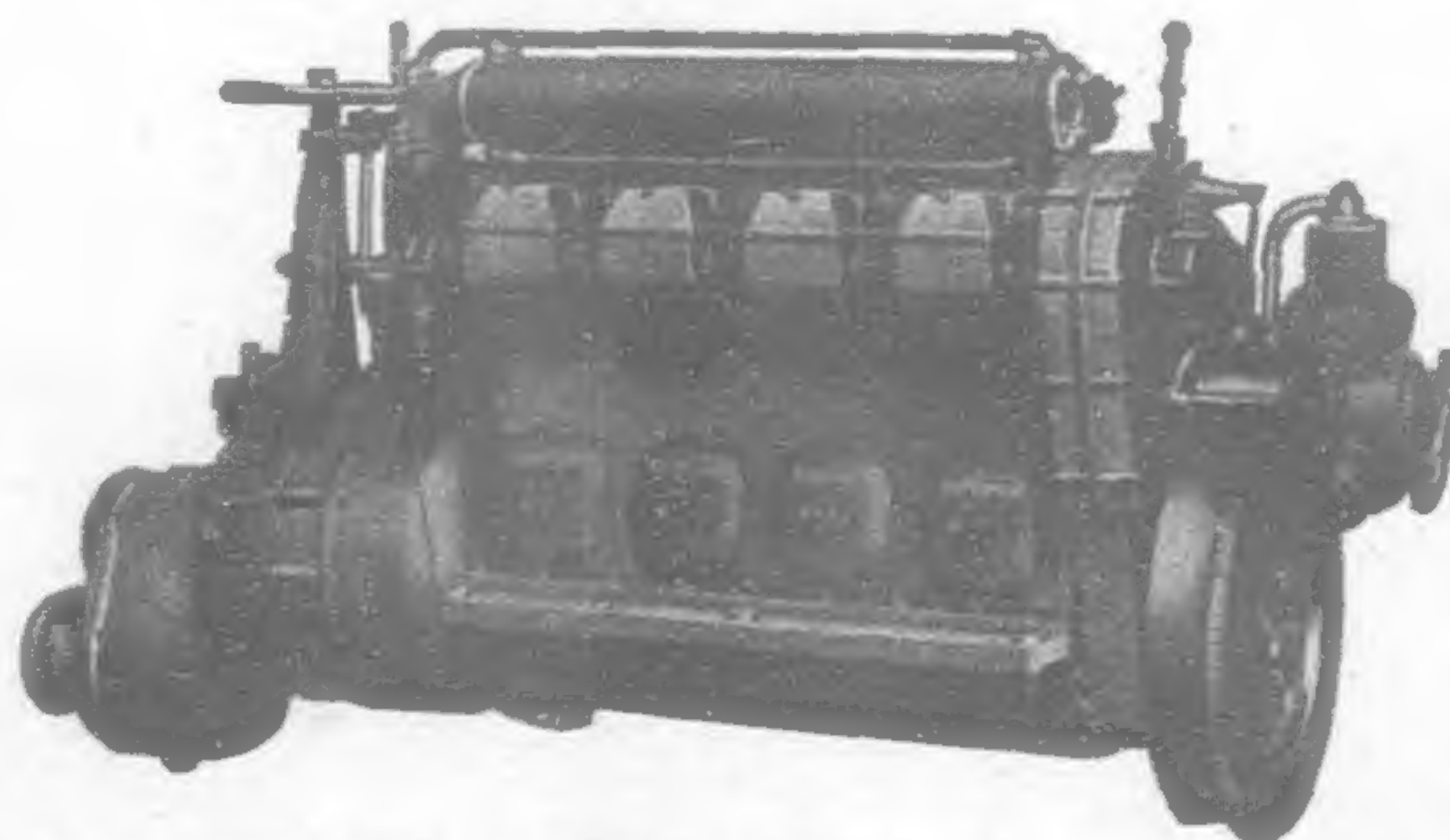
MINING

CHINESE SULPHUR MINES.—The opening and development of sulphur mines in Hunan, Honan and Shansi, is being considered by the Chinese Ministry of Industry. It is learnt that mineralogists will shortly be sent to the three provinces for prospecting purposes. Plans are being drafted by the Ministry for the operation of such mines on a commercial basis.—*Kuo Min*.

MANCHURIAN GOLD.—Several Japanese experts on placer gold mining are to be sent to investigate prospects for mining in Manchuria by the Ministry of Commerce and Industry shortly. The group will consist of eight engineers and five assistants, from the Geological Laboratory of the Ministry, and the appropriation of Yen 80,000 to finance the investigations has been requested. According to research by the South Manchuria Railway Company and also by officials of the Government, the gold deposits in the upper parts of the River Amur and the River Sungari may be worth as much as Yen 2,000,000,000.

COPPER DEPOSITS.—A geological survey group headed by the Leningrad geologist, M. Serpukhov, has discovered rich deposits of copper ores in the Okhotsk-Udsk district of the Far Eastern Region. These deposits are reported to extend over an area of 20 square kilometers.

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